UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
PREVENTION, PESTICIDES
AND TOXIC SUBSTANCES

Note to Reader
January 8, 1998

Background: As part of its effort to involve the public in the implementation of the Food Quality Protection Act of 1996 (FQPA), which is designed to ensure that the United States continues to have the safest and most abundant food supply. EPA is undertaking an effort to open public dockets on the organophosphate pesticides. These dockets will make available to all interested parties documents that were developed as part of the U.S. Environmental Protection Agency's process for making reregistration eligibility decisions and tolerance reassessments consistent with FQPA. The dockets include preliminary health assessments and, where available, ecological risk assessments conducted by EPA, rebuttals or corrections to the risk assessments submitted by chemical registrants, and the Agency's response to the registrants' submissions.

The analyses contained in this docket are preliminary in nature and represent the information available to EPA at the time they were prepared. Additional information may have been submitted to EPA which has not yet been incorporated into these analyses, and registrants or others may be developing relevant information. It's common and appropriate that new information and analyses will be used to revise and refine the evaluations contained in these dockets to make them more comprehensive and realistic. The Agency cautions against premature conclusions based on these preliminary assessments and against any use of information contained in these documents out of their full context. Throughout this process, If unacceptable risks are identified, EPA will act to reduce or eliminate the risks.

There is a 60 day comment period in which the public and all interested parties are invited to submit comments on the information in this docket. Comments should directly relate to this organophosphate and to the information and issues available in the information docket. Once the comment period closes, EPA will review all comments and revise the risk assessments, as necessary.

These preliminary risk assessments represent an early stage in the process by which EPA is evaluating the regulatory requirements applicable to existing pesticides. Through this opportunity for notice and comment, the Agency hopes to advance the openness and scientific soundness underpinning its decisions. This process is designed to assure that America continues to enjoy the safest and most abundant food supply. Through implementation of EPA's tolerance reassessment program under the Food Quality Protection Act, the food supply will become even safer. Leading health experts recommend that all people eat a wide variety of foods, including at least five servings of fruits and vegetables a day.

Note: This sheet is provided to help the reader understand how refined and developed the pesticide file is as of the date prepared, what if any changes have occurred recently, and what new information, if any, is expected to be included in the analysis before decisions are made. **It is not meant to be a summary of all current information regarding the chemical.** Rather, the sheet provides some context to better understand the substantive material in the docket (RED chapters, registrant rebuttals, Agency responses to rebuttals, etc.) for this pesticide.

Further, in some cases, differences may be noted between the RED chapters and the Agency's comprehensive reports on the hazard identification information and safety factors for all organophosphates. In these cases, information in the comprehensive reports is the most current and will, barring the submission of more data that the Agency finds useful, be used in the risk assessments.

Jack E. Housenger, Acting Director
Special Review and Reregistration Division

January 9, 1998

MEMORANDUM:

SUBJECT: Disulfoton (032501), Reregistration Case No. 0102.
Product and Residue Chemistry Chapters for the
Reregistration Eligibility Decision (RED).
DP Barcode No. 240483, No MRID.

FROM: John Abbotts, Chemist
Chemistry and Exposure Branch I
Health Effects Division [7509C]

THRU: Francis B. Suhre, Branch Senior Scientist
Chemistry and Exposure Branch I
Health Effects Division [7509C]

TO: David Anderson
Reregistration Branch II
Health Effects Division [7509C]
and
Dana Lateulere
Reregistration Branch III
Special Review and Reregistration Division [7508W]

The Product and Residue Chemistry chapters for the Disulfoton RED are attached. The chapters were assembled by Dynamac Corporation under the supervision of CEBI, HED. The data assessment has undergone secondary review in the branch and has been revised to reflect Agency policies.

With regard to Product Chemistry, additional data are required for the 98.5% T pertaining to certified limits and enforcement analytical methods; data are also needed to meet the new requirement concerning UV/visible absorption (OPPTS GLN 830.7050). Additional data are required for the 68% and 2% FIs concerning enforcement analytical methods. Provided that the registrant submits the remaining required data, and either certifies that the suppliers of beginning materials and the manufacturing processes have not changed since the last comprehensive product chemistry review, or submits completed

updated product chemistry data packages, the Branch has no objections to the reregistration of Disulfoton with respect to product chemistry data requirements.

With regard to Residue Chemistry, plant metabolism remains an outstanding reregistration data requirement; until this requirement is satisfied, conclusions on all requirements for crop magnitude of the residue studies must be considered conditional. Reassessment of tolerances in Table C of the Residue Chemistry chapter is also conditional on satisfying the plant metabolism requirement. Field trial data remain outstanding for lettuce and cotton. For other crops, submitted field trial data are not entirely consistent with label use patterns, but data requirements may be satisfied by label amendments. Crops in this category include barley, cowpea forage and hay, field pea vines and hay, peanuts, sorghum, soybeans, tomatoes, wheat, and nonbearing fruit trees; further details are provided in the endnotes to Table B in the Residue Chemistry chapter. Data also remain outstanding for field rotational crops. For several crops not being supported for reregistration, data requirements will be waived provided tolerances are revoked.

Livestock feeding studies are satisfactory, up to feeding levels specified, and tolerances are recommended for ruminant commodities. Once the nature of the residue in plants is adequately understood and adequate magnitude of the residue data are available on all major feed items, this requirement will be reevaluated to determine if additional livestock feeding data are needed.

With regard to dietary exposure assessment, anticipated residues have been determined for chronic dietary risk (CBRS 10994, 17923, 9/17/97, J. Abbotts).

If additional information is required, please advise.

Attachment 1: Reregistration Eligibility Decision:
Product Chemistry Considerations
Attachment 2: Reregistration Eligibility Decision:
Residue Chemistry Considerations

cc(without Attachments):RF
cc(with Attachments): Abbotts, List A File
RDI:ResChemTeam:11/6/97:ChemSAC:1/7/98:FBSuhre:1/8/98
7509C:CEBI:JAbbotts:CM-2:Rm805B:305-6230:1/9/98
disulfot.red

DISULFOTON
Shaughnessy No. 032501; Case 0102

Reregistration Eligibility Decision:
Product Chemistry Considerations

October 3, 1997

Contract No. 68-D4-0010

Submitted to:
U.S. Environmental Protection Agency
Arlington, VA

Submitted by:
Dynamac Corporation
The Dynamac Building
2275 Research Boulevard
Rockville, MD 20850-3268

DISULFOTON

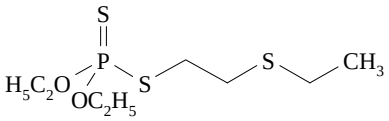
REREGISTRATION ELIGIBILITY DECISION:

PRODUCT CHEMISTRY CONSIDERATIONS

Shaughnessy No. 032501; Case No. 0102

DESCRIPTION OF CHEMICAL

Disulfoton (O,O-diethyl S-[2-(ethylthio)ethyl] phosphorodithioate] is an acaricide and insecticide registered for use on vegetables, fruits, and cereal grains.



Empirical Formula:	$C_8H_{19}O_2PS_3$
Molecular Weight:	274.4
CAS Registry No.:	298-04-4
Shaughnessy No.:	032501

IDENTIFICATION OF ACTIVE INGREDIENT

Disulfoton is a colorless to yellow liquid with a boiling point of 62 C at 0.01 mm Hg. Disulfoton is soluble in water at 25 ppm at 20 C, and is miscible in dichloromethane, hexane, 2-propanol, and toluene at 20 C.

MANUFACTURING-USE PRODUCTS

A search of the Reference Files System (REFS) conducted 7/30/97 identified three disulfoton manufacturing-use products (MPs) registered under Shaughnessy No. 032501 to Bayer Corporation: the 98.5% technical (T; EPA Reg. No. 3125-183) and the 68% and 2% formulation intermediates (FIs; EPA Reg. Nos. 3125-158 and 3125-128, respectively). We note that REFS identifies the 2% FI as an end-use product; however, the label (dated 6/16/94) states that the product is for repackaging only. This product is correctly identified as an MP. Only the Bayer 98.5%, 68%, and 2% disulfoton MPs are subject to a reregistration eligibility decision.

REGULATORY BACKGROUND

The Disulfoton Reregistration Standard dated 4/6/84 required additional generic and product-specific product chemistry data for disulfoton MPs; however, the Disulfoton Guidance Document

dated 12/84 required all updated product chemistry data. The Disulfoton Reregistration Standard Update dated 1/25/91 reviewed product chemistry data submitted in response to the Guidance Document and summarized the available database in support of the reregistration of disulfoton. Additional product chemistry data were required concerning GLNs 61-1, 61-2, 62-2, 62-3, 63-10, and 63-13 (OPPTS 830.1550, 830.1600-1650, 830.1750, 830.1800, 830.7370, and 830.6313) for the Bayer disulfoton MPs.

The current status of the product chemistry data requirements for the disulfoton MPs is presented in the attached data summary tables. These tables should be consulted for a listing of the outstanding product chemistry data requirements.

CONCLUSIONS

Most data requirements are satisfied for the 98.5% T; additional data are required pertaining to certified limits, enforcement analytical methods, and UV/visible absorption of the PAI (OPPTS 830.1750, 830.1800, and 830.7050). Additional data are required for the 68% and 2% FI concerning enforcement analytical methods (OPPTS 830.1800). Provided that the registrant submits the data required in the attached data summary tables for the 98.5% T and 68% and 2% FIs, and either certifies that the suppliers of beginning materials and the manufacturing processes for the disulfoton MPs have not changed since the last comprehensive product chemistry review or submits complete updated product chemistry data packages, CBRS has no objections to the reregistration of disulfoton with respect to product chemistry data requirements.

AGENCY MEMORANDA CITED IN THIS DOCUMENT

CBRS No(s).:	13169
DP Barcode(s):	D198930
Subject:	Disulfoton Reregistration. List A Chemical No. 032501; Case No. 0102. Miles Inc.: Response to Disulfoton Product Chemistry Data Requirements for Their 95% T/MP, 68% FI, and 2% FI Regarding GLN Nos. 61-1, 61-2, 61-3, 62-2, 62-3, 63-10, and 63-13.
From:	F. Toghrol
To:	L. Schnaubelt
Dated:	9/12/94
MRID(s):	43058601-43058606 and 43093601

CBRS No(s).: 14834
DP Barcode(s): D210218
Subject: Disulfoton Reregistration. Miles 12/9/94 Submission [Rebuttal of 62-2 & 62-3 Data Gaps for the 95% Technical; 3125-183] in Response to F. Toghrol 9/12/94 Review; CBRS 13169.
From: K. Dockter
To: P. Deschamp
Dated: 5/13/96
MRID(s): None

PRODUCT CHEMISTRY CITATIONS

Bibliographic citations include only MRIDs containing data which fulfill data requirements.

References (cited):

00148493 Mobay Chemical Corp. (1985) Product Chemistry of Di-Syston Insecticide, Di-Syston 68% Concentrate, Di-Syston 2% Granular Systemic Insecticide, Di-Syston 2% Granular (Repackaging), Disyston 2% Systemic Insecticide Granules. Unpublished compilation. 47 p.

00150088 Mobay Chemical Corp. (1984) Product Chemistry of Di-Syston Insecticide. Unpublished compilation. 90 p.

43058601 Fontaine, L. (1993) Product Chemistry of DI-SYSTON Technical: Supplement to MRID 00150088: Lab Project Number: MCL0412: 011054: 101010. Unpublished study prepared by Miles Inc., Agriculture Division. 54 p.

43058602 Fontaine, L. (1993) Product Chemistry of DI-SYSTON Technical: Supplement to MRID 00150088: Lab Project Number: 86255: 106454: C-4.54. Unpublished study prepared by Miles Inc., Agriculture Division. 37 p.

43058603 Fontaine, L. (1993) Product Chemistry of DI-SYSTON 68% Concentrate: Supplement to MRID 00148493 and 00150088: Lab Project Number: 501835: PC0533: BR 1862. Unpublished study prepared by Miles Inc., Agriculture Division. 19 p.

43058604 Fontaine, L. (1993) Product Chemistry of DI-SYSTON 68% Concentrate: Supplement to MRID 00148492 and 00150088: Lab Project Number: 86767: BR 1863: PC0539. Unpublished study prepared by Miles Inc., Agriculture Division. 12 p.

43058605 Fontaine, L. (1993) Product Chemistry of DI-SYSTON 2% Granular for Repackaging Use Only: Supplement to MRID 00148492 and 00150088: Lab Project Number: 401630: 301422: 301476. Unpublished study prepared by Miles Inc., Agriculture Division. 33 p.

43058606 Fontaine, L. (1993) Product Chemistry of DI-SYSTON 2% Granular for Repackaging Only: Supplement to MRID 00148493 and 00150088: Lab Project Number: 86766: PC0536: BR 1865. Unpublished study prepared by Miles Inc., Agriculture Division. 12 p.

43093601 Fontaine, L. (1993) Product Chemistry of DI-SYSTON Technical: Supplement to MRID 00148493 and 00150088: Lab Project Number: 91267: 95065: 95066. Unpublished study prepared by Miles Inc., Agriculture Division. 102 p.

Case No. 0102
Chemical No. 032501

Case Name: Disulfoton
Registrant: Bayer Corporation
Product(s): 98.5% T (EPA Reg. No. 3125-183)

PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? [1]	MRID Number [2]
830.1550	Product Identity and Disclosure of Ingredients	Y	**00150088**, 43058601, 43058602
830.1600 830.1620 830.1650	Starting Materials and Manufacturing Process	Y	**00150088**, 43058601
830.1670	Discussion of Formation of Impurities	Y	**00148493**, 43058601
830.1700	Preliminary Analysis	Y	**00150088**, 43058602
830.1750	Certification of Ingredient Limits	N [3]	**00148493**, 43058602
830.1800	Analytical Methods to Verify the Certified Limits	N [4]	**00148493**, **00150088**, 43058602
830.6302	Color	Y	**00150088**
830.6303	Physical State	Y	**00150088**
830.6304	Odor	Y	**00150088**
830.6313	Stability	Y	**00150088**, 43093601
830.6314	Oxidation/Reduction	Y	**00148493**
830.6315	Flammability	Y	**00150088**
830.6316	Explodability	Y	**00150088**
830.6317	Storage Stability	Y	**00148493**
830.6319	Miscibility	N/A [5]	**00150088**
830.6320	Corrosion Characteristics	Y	**00148493**
830.7000	pH	Y	**00150088**
830.7050	UV/Visible Absorption	N [6]	
830.7100	Viscosity	Y	**00148493**
830.7200	Melting Point/Melting Range	N/A [7]	
830.7220	Boiling Point/Boiling Range	Y	**00148493**
830.7300	Density/Relative Density/Bulk Density	Y	**00148493**, **00150088**
830.7370	Dissociation Constant in Water	Y	43093601
830.7550 830.7560 830.7570	Partition Coefficient (Octanol/Water)	Y	**00148493**
830.7840 830.7860	Solubility	Y	**00150088**
830.7950	Vapor Pressure	Y	**00148493**, **00150088**

[1] Y = Yes; N = No; N/A = Not Applicable.

[2] **Bolded** references were reviewed in the Disulfoton Reregistration Standard Update dated 1/25/91, and all other references were reviewed under CBRS No. 13169, D198930, 9/12/94, F. Toghrol.

[3] Upper certified limits for impurities structurally related to the active ingredient and present at greater than 0.1%, and for an EPA List 2 potentially toxic inert must be provided on an amended CSF. The Agency has addressed the registrant's claim that these impurities are not toxicologically significant (CBRS No. 14834, D210218, 5/13/96, K. Dockter), and requires that the registrant submit data which demonstrate that all the impurities are not toxicologically significant or a revised CSF with upper certified limits for all impurities quantitated in preliminary analysis.

[4] Additional validation data must be submitted for the methods used to determine the active ingredient and impurities present at greater than 0.1%. The Agency has addressed the registrant's claim that these impurities are not of toxicological significance (CBRS No. 14834, D210218, 5/13/96, K. Dockter), and requires validation data for the active ingredient and all impurities quantitated.

[5] Data are not required because the product is not typically diluted with petroleum solvents.

[6] The OPPTS Series 830, Product Properties Test Guidelines require data pertaining to UV/visible absorption for the PAI.

[7] Data are not required because the TGAI/MP is a liquid at room temperature.

Case No. 0102
Chemical No. 032501

Case Name: Disulfoton
Registrant: Bayer Corporation
Product(s): 68% FI (EPA Reg. No. 3125-158)

PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? [1]	MRID Number [2]
830.1550	Product Identity and Disclosure of Ingredients	Y [3]	**00150088**, 43058603, 43058604
830.1600 830.1620 830.1650	Starting Materials and Manufacturing Process	Y	**00150088**, 43058603
830.1670	Discussion of Formation of Impurities	Y	**00150088**
830.1700	Preliminary Analysis	N/A [4]	
830.1750	Certification of Ingredient Limits	Y	**00148493**, 43058604
830.1800	Analytical Methods to Verify the Certified Limits	N [5]	**00148493**, **00150088**
830.6302	Color	Y	**00150088**
830.6303	Physical State	Y	**00150088**
830.6304	Odor	Y	**00150088**
830.6313	Stability	N/A [4]	
830.6314	Oxidation/Reduction	Y	**00150088**
830.6315	Flammability	Y	**00150088**
830.6316	Explodability	Y	**00150088**
830.6317	Storage Stability	Y	**00150088**
830.6319	Miscibility	N/A [6]	**00150088**
830.6320	Corrosion Characteristics	Y	**00150088**
830.7000	pH	N/A [7]	
830.7050	UV/Visible Absorption	N/A [4]	
830.7100	Viscosity	Y	**00150088**
830.7200	Melting Point/Melting Range	N/A [4]	
830.7220	Boiling Point/Boiling Range	N/A [4]	
830.7300	Density/Relative Density/Bulk Density	Y	**00150088**
830.7370	Dissociation Constant in Water	N/A [4]	
830.7550 830.7560 830.7570	Partition Coefficient (Octanol/Water)	N/A [4]	
830.7840 830.7860	Solubility	N/A [4]	
830.7950	Vapor Pressure	N/A [4]	

[1] Y = Yes; N = No; N/A = Not Applicable.

[2] **Bolded** references were reviewed in the Disulfoton Reregistration Standard Update dated 1/25/91, and all other references were reviewed under CBRS No. 13169, D198930, 9/12/94, F. Toghrol.

[3] We note that the source of an inert ingredient was not listed on the CSF.

[4] TGAI/PAI data requirements will be satisfied by data for the technical source product.

[5] Additional validation data are required for the method used to quantitate the active ingredient in this formulation (CBRS No. 13169, D198930, 9/12/94, F. Toghrol).

[6] Data are not required because the product is not typically diluted with petroleum solvents.

[7] Data are not required because the MP is practically insoluble in water.

Case No. 0102
Chemical No. 032501

Case Name: Disulfoton
Registrant: Bayer Corporation
Product(s): 2% FI (EPA Reg. No. 3125-128) basic and alternate formulations

PRODUCT CHEMISTRY DATA SUMMARY

Guideline Number	Requirement	Are Data Requirements Fulfilled? [1]	MRID Number [2]
830.1550	Product Identity and Disclosure of Ingredients	Y [3]	**00150088**, 43058605, 43058606
830.1600 830.1620 830.1650	Starting Materials and Manufacturing Process	Y	**00150088**, 43058605, 43058606
830.1670	Discussion of Formation of Impurities	Y	**00150088**
830.1700	Preliminary Analysis	N/A [4]	
830.1750	Certification of Ingredient Limits	Y	**00148493**, 43058605, 43058606
830.1800	Analytical Methods to Verify the Certified Limits	N [5]	**00148493**, **00150088**
830.6302	Color	Y	**00150088**
830.6303	Physical State	Y	**00150088**
830.6304	Odor	Y	**00150088**
830.6313	Stability	N/A [4]	
830.6314	Oxidation/Reduction	Y	**00150088**
830.6315	Flammability	N/A [6]	
830.6316	Explodability	Y	**00150088**
830.6317	Storage Stability	Y	**00150088**
830.6319	Miscibility	N/A [6]	
830.6320	Corrosion Characteristics	Y	**00150088**
830.7000	pH	N/A [7]	
830.7050	UV/Visible Absorption	N/A [4]	
830.7100	Viscosity	N/A [6]	
830.7200	Melting Point/Melting Range	N/A [4]	
830.7220	Boiling Point/Boiling Range	N/A [4]	
830.7300	Density/Relative Density/Bulk Density	Y	**00150088**
830.7370	Dissociation Constant in Water	N/A [4]	
830.7550 830.7560 830.7570	Partition Coefficient (Octanol/Water)	N/A [4]	
830.7840 830.7860	Solubility	N/A [4]	
830.7950	Vapor Pressure	N/A [4]	

[1] Y = Yes; N = No; N/A = Not Applicable.

[2] **Bolded** references were reviewed in the Disulfoton Reregistration Standard Update dated 1/25/91, and all other references were reviewed under CBRS No. 13169, D198930, 9/12/94, F. Toghrol.

[3] We note that the sources of the inert ingredients were not listed on the CSFs for the basic and alternate formulations.

[4] TGAI/PAI data requirements will be satisfied by data for the technical source product.

[5] Additional validation data are required for the method used to quantitate the active ingredient in this formulation (CBRS No. 13169, D198930, 9/12/94, F. Toghrol).

[6] Data are not required because the MP is a solid at room temperature.

[7] Data are not required because the MP is practically insoluble in water.

DISULFOTON
Shaughnessy No. 032501; Case 0102

Reregistration Eligibility Decision:
Residue Chemistry Considerations

October 3, 1997

Contract No. 68-D4-0010

Submitted to:
U.S. Environmental Protection Agency
Arlington, VA

Submitted by:
Dynamac Corporation
The Dynamac Building
2275 Research Boulevard
Rockville, MD 20850-3268

DISULFOTON

REREGISTRATION ELIGIBILITY DECISION

RESIDUE CHEMISTRY CONSIDERATIONS

Shaughnessy No. 032501; Case 0102

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DISULFOTON

REREGISTRATION ELIGIBILITY DECISION

RESIDUE CHEMISTRY CONSIDERATIONS

Shaughnessy No. 032501; Case 0102

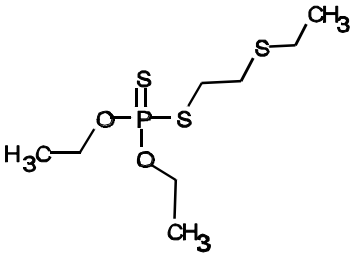
INTRODUCTION

Disulfoton (O,O-diethyl S-[2-(ethylthio)ethyl] phosphorodithioate) is an acaricide and insecticide registered by Bayer Corporation under the trade name Di-Syston®. Disulfoton is currently registered for preplant, at-planting, preemergence, and foliar applications to asparagus, barley, beans, Bermuda grass (grown for seed), broccoli, Brussels sprouts, cabbage, cauliflower, coffee, corn (field, pop, and sweet), cotton, lentils, lettuce, oats, peanuts, peas, pecans, peppers, potatoes, sorghum, soybeans, tobacco, tomatoes, triticale, and wheat. In general, applications may be made with either ground or aerial equipment. The 2% and 15% granular (G), 95% ready-to-use (RTU), and 8 lb/gal emulsifiable concentrate (EC) formulations are the disulfoton formulation classes registered for use on food/feed crops.

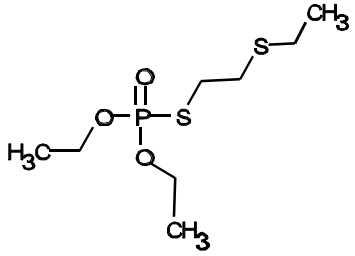
REGULATORY BACKGROUND

Disulfoton is a List A FIFRA reregistration chemical and was the subject of a Reregistration Standard Guidance Document dated 12/84. The Residue Chemistry Chapter of the Guidance Document was completed on 4/6/84. The Residue Chemistry Chapter Update of the Disulfoton Reregistration Standard was issued on 1/25/91. These documents summarized the regulatory conclusions based on available residue chemistry data, and specified the additional data required for reregistration purposes. Several data submissions have been received and evaluated since the Update. The information contained in this document outlines the Residue Chemistry Science Assessments with respect to the reregistration of disulfoton.

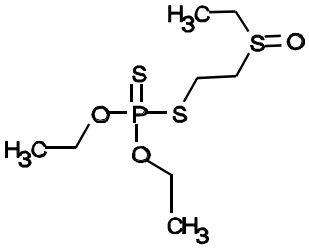
Tolerances are established for the combined residues of disulfoton and its cholinesterase-inhibiting metabolites, calculated as demeton, in/on various raw agricultural plant commodities [40 CFR §180.183(a) and (b)]. Tolerances are established for residues of disulfoton *per se*, calculated as demeton, in processed feed commodities [40 CFR §186.1950]. The chemical structures of identified tolerance residues are presented in
Figure 1; full chemical names are listed in Table A. Adequate methods are available for the enforcement of tolerances for plant commodities.



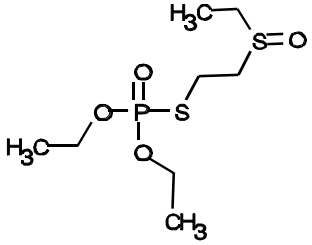
I. Disulfoton



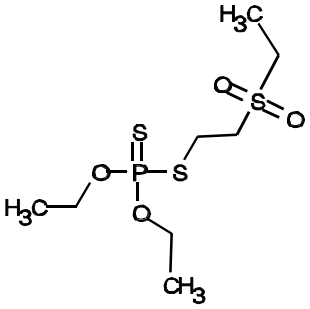
IV. Disulfoton oxygen analog; Demeton-S



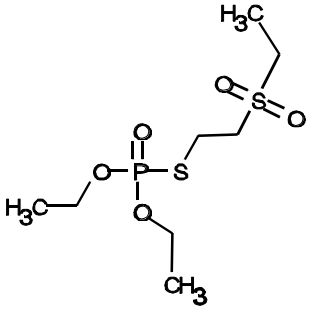
II. Disulfoton sulfoxide



V. Disulfoton oxygen analog sulfoxide



III. Disulfoton sulfone



VI. Disulfoton oxygen analog sulfone

Figure 1. Identified Disulfoton tolerance residues.

Table A. Chemical Names of Identified Disulfoton Tolerance Residues (Structures in Figure 1).

Common Name Chemical Name	**Common Name** Chemical Name
I. Disulfoton O,O-diethyl S-[2-(ethylthio)ethyl]phosphorodithioate	**IV. Disulfoton oxygen analog; Demeton-S** O,O-diethyl S-[2-(ethylthio)-ethyl]phosphorothioate
II. Disulfoton sulfoxide O,O-diethyl S-[2-(ethylsulfinyl)ethyl]phosphorodithioate	**V. Disulfoton oxygen analog sulfoxide** O,O-diethyl S-[2-(ethylsulfinyl)-ethyl]phosphorothioate
III. Disulfoton sulfone O,O-diethyl S-[2-(ethylsulfonyl)ethyl]-phosphorodithioate	**VI. Disulfoton oxygen analog sulfone** O,O-diethyl S-[2-(ethylsulfonyl)-ethyl]phosphorothioate

The Food Quality Protection Act (FQPA) of 1996 has amended and strengthened the standard for establishing tolerances under the Federal Food, Drug, and Cosmetic Act (FFDCA). The Office of Pesticide Programs is still assessing the full impact of this change in the law, and plans to issue guidelines concerning the establishment and reassessment of tolerances under the amended statute. All future tolerance petitions as well as reassessment of established tolerances must meet the requirements of the FFDCA as amended by the FQPA. The Office of Pesticide Programs (OPP) may require additional data to determine if the terms of the amended statute are met. The information contained in this document outlines the Residue Chemistry Science Assessments with respect to the reregistration of disulfoton.

SUMMARY OF SCIENCE FINDINGS

GLN 860.1200: Directions for Use

The basic producer of disulfoton is Bayer Corporation (formerly Miles, Inc.), and the majority of residue chemistry data in support of reregistration have been submitted by Bayer. According to a REFS search, conducted on 7/30/97, there are five active Bayer end-use products (EPs) containing the active ingredient disulfoton which are registered for use on food/feed crops. These EPs, including the associated Special Local Need (SLN) registrations under FIFRA Section 24(c), are listed in Table A1.

Table A1. Disulfoton EPs with Food/Feed Uses Registered to Bayer Corporation.

EPA Reg. No.	Label Acceptance Date [1]	Formulation	Product Name
3125-83 [2]	6/1/95	2% G	DI-SYSTON® 2% Granular Systemic Insecticide
3125-126 [2]	4/25/94	2% G	DI-SYSTON® Systemic Insecticide For Vegetables
3125-172 [3]	8/11/95	15% G	DI-SYSTON® 15% Granular Systemic Insecticide
3125-173	10/31/89	95% RTU	DI-SYSTON® Seed Treatment Insecticide
3125-307 [4]	10/13/94	8 lb/gal EC	DI-SYSTON® 8

[1] Date of the most recently EPA-approved label found by reviewer in the product jacket or Pesticide Product Label System (PPLS).
[2] This product is for homeowner use only.
[3] Including SLN Nos. CA760019, ID830035, ID850016, MT800004, NC920011, OR790042 (on order), OR800034, OR830057, VA920006, and WA850036.
[4] Including SLN Nos. AZ850007, CA770036, CA810044, CA840192, CA920025, CA960014, ME880001, NC860005, NM880001, OK880002, OR840032, TX860007, TX900004, WA840036, and WY870004.

A comprehensive summary of disulfoton food/feed use patterns, based on the product labels registered to Bayer, is presented in Table A2. A tabular summary of the residue chemistry science assessments for reregistration of disulfoton is presented in Table B. The status of reregistration requirements for each guideline topic listed in Table B are based on the use patterns registered by the basic producer.

Non-food uses of disulfoton: A list of disulfoton non-food/non-feed use patterns, based on the product labels registered to Bayer, is presented below. The registered uses of disulfoton on the following sites, typically considered food use sites, have been determined to be non-food uses based on an examination of the product labels: nonbearing fruits, raspberries (nursery stock), radish excluding daikon (seed crop), and strawberries (propagating plants). As a result of the non-food use classification, residue chemistry data are not required and tolerances need not be proposed for the reregistration of these uses.

Nonbearing fruits (including apples, apricots, cherries, crabapples, peaches, pears, plums, and prunes): The 15% G (EPA Reg. No. 3125-172) formulation is registered for use as a soil application at 0.024-0.234 lb ai/tree or 0.375 oz ai/inch of trunk diameter. Application is made uniformly on all sides from the trunk to drip line and is followed by soil incorporation. Application to trees bearing fruit during that crop year is prohibited.

The Residue Chemistry Chapter (4/6/84) designated this use as non-food. However, current guidelines (OPPTS Test Guidelines, Residue Chemistry, 860.1000, August 1996) require that for pesticides not known to be persistent and systemic (criteria which disulfoton satisfies), a label restriction against harvesting within one year of application is required for a use to be declared nonfood. Such a restriction is required for this use on fruit trees.

Radish excluding daikon (seed crop): The 15% G (SLN No. WA920027) and the 8 lb/gal EC (SLN No. WA920026) formulations are registered for use as a single soil injection application at first seed stalk bolting at 1.5-2.0 lb ai/A. Use is limited to eastern WA. The feeding or grazing of radish forage or fodder is prohibited. The cutting of radish tops for hay or forage is prohibited. The use of any portion of the treated field, including seed, seed screening, hay, forage, or stubble for human or animal consumption is prohibited.

Raspberries (nursery stock): The 15% G (EPA Reg. No. 3125-172) formulation is registered for use for two banded soil incorporated applications at 8.0 lb ai/A/application. Use is limited to Northeast states. Application is allowed at planting and "later in the season."

Strawberries (propagating plants only): The 15% G (EPA Reg. No. 3125-172) formulation is registered for use as a soil broadcast or sidedress application at 2.6-5.2 oz ai/1,000 ft of row (for any row spacing) or 2.0-4.0 lb ai/A (42-inch row spacing). The 8 lb/gal EC (EPA Reg. No. 3125-307) formulation is registered for use as a soil injection application at 2.8-5.0 oz ai/1,000 ft of row (for any row spacing) or 2.0-4.0 lb ai/A (42-inch row spacing). Use of fruit from treated plants for food purposes is prohibited.

For the purpose of generating this Residue Chemistry Science Chapter, the Chemistry Branch examined the registered food/feed use patterns of the basic producer and reevaluated the available residue chemistry database for adequacy in supporting these use patterns. When end-use product DCIs are developed (e.g., at issuance of the RED), RD should require that all end-use product labels (e.g., MAI labels, SLNs, and products subject to the generic data exemption) be amended such that they are consistent with the basic producer labels.

Label amendments are also required to incorporate the parameters of use patterns reflected in the submitted field trials. Details of the required label amendments are presented in the endnote for GLN 860.1200 (Directions for Use) and in the endnotes for specific crops under GLN 860.1500 in Table B.

GLN 860.1300: Nature of the Residue - Plants

The reregistration requirements for plant metabolism are not fulfilled. Additional information is required to upgrade existing studies with lettuce, potatoes, soybeans, and wheat. In the interim, the HED Metabolism Committee has determined that residues to be regulated in plant commodities are disulfoton, disulfoton oxygen analog, and their sulfoxides and sulfones (see Figure 1). The Committee also determined that demonstration by the registrant that significant unknown disulfoton metabolites in plants do not contain phosphorus would be sufficient for waiving regulatory concern over those unknowns.

GLN 860.1300: Nature of the Residue - Livestock

The reregistration requirements for livestock metabolism are fulfilled. Acceptable studies depicting the qualitative nature of the residue in ruminants and poultry have been submitted and evaluated. Disulfoton and its sulfonic acid metabolites were the major detected residues. The HED Metabolism Committee has determined that the sulfonic acid metabolites need not be included in the tolerance expression for livestock commodities and that residue data for sulfonic acid metabolites in livestock commodities are not required. The residues of concern in livestock commodities are disulfoton and its cholinesterase-inhibiting metabolites.

GLN 860.1340: Residue Analytical Methods

Adequate methods are available for data collection and tolerance enforcement for plant and livestock commodities. The Pesticide Analytical Manual (PAM) Vol. II lists the enforcement methods for demeton, paper chromatography and colorimetric methods, as Method I. A GC method (Method II) with potassium chloride thermionic detection is listed for the determination of disulfoton, its oxygen analog, and their sulfoxides and sulfones in/on plant commodities. This method involves oxidation of disulfoton and its sulfoxide to disulfoton sulfone and oxidation of disulfoton oxygen analog and its sulfoxide to disulfoton oxygen analog sulfone. Methods used for data collection for plant commodities include GC methods similar to Method II of PAM Vol. II, total phosphorus methods similar to the demeton colorimetric method listed as Method II of PAM, and methods based on cholinesterase-inhibition. Methods used for data collection for livestock commodities include GC methods similar to Method II of PAM II; the method limit of quantitation (LOQ) is
0.05 ppm in meat and 0.01 ppm in milk (D241353, 12/15/97, J. Abbotts).

We note that the GC method in PAM calculates residues in terms of disulfoton whereas the tolerance expression states that residues are calculated as demeton. The majority of data used for tolerance reassessment were collected using the enforcement GC method (or modification thereof). Therefore, the tolerance expression should be revised to state that residues are to be calculated as disulfoton. This revision will also make the tolerance expression compatible with the Codex expression.

Plant metabolism data remain outstanding. If additional plant metabolites which require regulation are identified, then additional analytical methodology for these metabolites will be required.

GLN 860.1360: Multiresidue Methods

The 2/97 FDA PESTDATA database (PAM Volume I, Appendix I) indicates that disulfoton, its sulfoxide and sulfone, demeton-S (disulfoton oxygen analog), and its sulfoxide and sulfone are

completely recovered (>80%) using Multiresidue Method Section 302 (Luke Method; Protocol D). Disulfoton is partially recovered (50-74%) and metabolites disulfoton sulfone and demeton-S are not recovered using Multiresidue Method Section 303 (Mills, Onley, Gaither Method; Protocol E, non-fatty foods). Disulfoton is not recovered using Section 304 (Mills Method; Protocol E, fatty foods).

GLN 860.1380: Storage Stability Data

The reregistration requirements for storage stability data are partially fulfilled. Storage stability data for livestock commodities will be required to support available and/or new livestock feeding studies unless samples are stored less than one month prior to analysis.

The available storage stability data indicate that residues of disulfoton and its sulfoxide and sulfone are stable under frozen storage conditions for up to 13 months in potato chips and flakes, 24 months in/on potato wet peel and tomatoes, and for up to 36 months in/on alfalfa forage and hay; broccoli; coffee beans (dry); corn (sweet); cottonseed; lettuce; peanut meal, oil, and soapstock; peas (green); potato tubers; sorghum grain; strawberries; tobacco (cured); tomato catsup, juice, and dry pomace; and wheat grain, forage, straw, bran, flour, and shorts. Residues of disulfoton oxygen analog and its sulfoxide and sulfone are stable for up to 13 months in potato chips and flakes, 24 months in/on potato wet peel and sorghum grain, and for up to 36 months in/on alfalfa forage and hay; broccoli; coffee beans (dry); corn (sweet); cottonseed; lettuce; peanut meal and oil; peas; potato tubers; strawberries; tobacco (cured); tomatoes and tomato catsup, juice, and dry pomace; and wheat grain, forage, straw, bran, flour, and shorts. The matrices chosen in the storage stability study are representative of the raw agricultural and processed commodities resulting from registered uses of disulfoton. These storage stability data have been compared with storage intervals and conditions for available field trial and processing data; for those crops that have been evaluated, the storage stabilty data are sufficient to support the magnitude of the residue studies (CBRS 17896, 6/18/97, J. Abbotts).

GLN 860.1500: Crop Field Trials

The reregistration requirements for magnitude of the residue in/on the following RACs will be considered fulfilled pending label revisions and/or tolerance adjustments: asparagus; barley, grain and straw; beans (succulent and dry); broccoli; Brussels sprouts; cabbage; cauliflower; coffee, beans; corn, field, forage, grain, and stover; corn, pop, grain and stover; corn, sweet (K+CWHR) and sweet corn forage and stover; cotton, seed; oats, forage, grain, and straw; peanuts, hay and nutmeats; peas (succulent and dry); pecans; peppers; potatoes; sorghum, forage, grain, and stover; soybeans, forage, hay, and seed; tomatoes; and wheat, forage, grain, and straw. Overall, adequate field trial data depicting disulfoton residues of concern following treatments according to the maximum registered use patterns have been submitted for the RACs listed above. Label revisions are required for some crops in order to reflect current Agency policies and/or to reflect the

parameters of use patterns for which field trial data are available. Refer to the "Tolerance Reassessment Summary" for recommendations regarding appropriate tolerance levels.

In addition, current guidelines (OPPTS Test Guidelines, Residue Chemistry, August 1996, 860.1000, Table 1) distinguish between grain sorghum and forage sorghum. The latter commodity falls under the grass category. To avoid additional data requirements on grasses, labels should be modified to limit use on grain sorghum only.

Moreover, Table A2 below includes postemergence use on soybeans grown for seed, with no PHI but a label restriction prohibiting soybeans grown for seed from being used for food, feed, or forage. The Residue Chemistry Chapter (4/6/84) advised that soybean seed was a raw agricultural commodity which could be diverted to human and livestock consumption. Accordingly, the Chapter recommended for postemergence application either the establishment of a 125 PHI, or restricting application to at-planting only. Under current residue chemistry Guidelines (OPPTS 860.1000), label restrictions against feeding soybean forage and hay are allowed, but restrictions on feeding seed are considered impractical. The label restrictions recommended by the Residue Chemistry Chapter therefore remain appropriate, with the additional requirement that the label limit application to one per growing season. If the registrant desires label conditions different from these limits for soybeans grown for seed, additional field trial data may be necessary.

Additional field trial data must be submitted before the reregistration requirements for magnitude of the residue in/on the following RACs will be fulfilled: cowpea forage and hay, field pea vines and hay, and lettuce. The registrant may choose to amend product labels to exclude use of disulfoton on cowpeas and field peas instead of submitting field trial data. As a result of changes in Table 1 (GLN 860.1000), field residue data are additionally now required for cotton gin byproducts. Tolerances should also be proposed for oat hay, based on data for wheat hay.

Adequate magnitude of the residue data are available for the aspirated grain fractions of corn, sorghum, and wheat. These data indicate that a tolerance for aspirated grain fractions is required. Data for soybean aspirated grain fractions are not required as use of disulfoton on soybeans is early in the growing season, and processing data indicate that soybean surface residues are not likely to be greater than residues in or on whole seed.

The registrant currently has no registered uses of disulfoton on alfalfa, clover, hops, pineapple, rice, spinach, sugar beets, and sugarcane. Provided tolerances are revoked for these crops, no additional field trial data are required. Because no field trial data are available, use on Bermuda grass grown for seed must be canceled.

An acceptable tobacco pyrolysis study has been submitted and evaluated.

GLN 860.1520: Processed Food/Feed

The reregistration requirements for magnitude of the residue in the processed commodities of the following crops have been fulfilled: coffee, field corn, cottonseed, peanuts, potatoes, soybeans, tomatoes, and wheat. Processing data for wheat may be translated to barley and oats.

Disulfoton residues of concern concentrated in wet potato peel (1.71x), in tomato paste (1.7x), and in wheat germ (2.12x). Based on a highest average field trial (HAFT) value for potatoes of 0.17 ppm, the expected residues in wet potato peel are 0.29 ppm, which is less than the reassessed tolerance of 0.50 ppm for potatoes. Based on a HAFT of 0.03 ppm, the expected residues in wheat germ are 0.06 ppm, which is less than the reassessed tolerance of 0.2 ppm for wheat grain. Based on a HAFT of 0.36 ppm, expected residues in tomato paste are 0.61 ppm, less than the reassessed tolerance of 0.75 ppm for tomatoes.

Residue data for sweet sorghum syrup must be submitted unless the registrant modifies product labels to exclude use on sweet sorghum.

The registrant currently has no registered uses of disulfoton on pineapple, rice, and sugarcane. Provided tolerances are revoked for these crops, no additional processing data are required.

GLN 860.1480: Meat, Milk, Poultry, and Eggs

Reregistration requirements for magnitude of the residue in meat, milk, poultry, and eggs are satisfied, up to the feeding levels in the studies described below (D241353, 12/15/97, J. Abbotts). Data remain outstanding on some feed items, so this requirement will be reevaluated once the nature of the residue in plants is adequately understood and magnitude of the residue data are available for all major feed items.

Milk and the fat, meat, and meat byproducts of cattle, goats, hogs, horses, and sheep: The maximum theoretical dietary burdens of disulfoton to beef and dairy cattle are 7.0 and 8.2 ppm, respectively (see table below).

Calculation of maximum ruminant dietary burden for disulfoton.

Feed Commodity	Reassessed Tolerance (ppm)	% Dry Matter	Beef Cattle		Dairy Cattle	
			% of Diet	Burden (ppm)	% of Diet	Burden (ppm)
Cotton, seed	0.75	88	25	0.21	25	0.21
Potato, processed waste	0.5	15	35	1.17	25	0.83
Sorghum, forage	5.0	35	40	5.71	50	7.14
		TOTAL	100	7.09	100	8.18

Available dairy cattle feeding data have been reviewed, at feeding levels of 3.6 and 7.2 ppm, and 18 ppm for milk only (D241353, 12/15/97, J. Abbotts). Maximum residues were 0.03 ppm in tissue, and 0.012 ppm in milk. Based on the maximum burdens in the Table above, appropriate tolerance values would be 0.05 ppm in ruminant meat commodities, and 0.01 ppm in milk.

Eggs and the fat, meat, and meat byproducts of poultry: The maximum theoretical dietary burden of disulfoton to poultry is calculated to be 0.87 ppm based on a diet consisting of 20% cottonseed meal and 80% sorghum grain. Available poultry feeding data have been reviewed, at feeding levels of 12 and 36 ppm (D241353, 12/15/97, J. Abbotts). In eggs, detectable levels up to 0.002 ppm, which were still below the method LOQ, were found in samples from two birds at the 36 ppm feeding level. In tissues, detectable residues were found at 0.02 ppm in one giblet sample from the 36 ppm level. Residues were nondetectable in all other samples from the 36 ppm feedng level, and in all samples from the 12 ppm group. Initial review of these data concluded that poultry commodities represented a Section 180.6(a)(3) category, and tolerances were not required for poultry and eggs
(PP 7F1895, 6/27/77, M.J. Nelson). The feeding levels represent 14x and 41x the **current** maximum dietary burden, respectively, and the conclusion that tolerances are not required for poultry commodities remains appropriate.

GLN 860.1400: Water, Fish, and Irrigated Crops

Disulfoton is presently not registered for direct use on water and aquatic food and feed crops. In addition, the registrant is not supporting use of disulfoton on rice. Provided tolerances on rice are revoked, no residue chemistry data are required under this guideline topic.

GLN 860.1460: Food Handling

Disulfoton is presently not registered for use in food-handling establishments; therefore, no residue chemistry data are required under this guideline topic.

GLNs 860.1850 and 860.1900: Confined/Field Accumulation in Rotational Crops

The reregistration requirements for confined accumulation in rotational crops are satisfied, and limited field rotational crop studies have been conducted. Provided the residues to be regulated in plants do not change under reregistration, rotational tolerance requirements can be waived for cereal grains at any plantback interval and for leafy vegetables at a plantback interval of at least 240 days. Extensive field rotational crop trials must be conducted for all crops, other than primary crops, for which rotation is desired. The Agency would not object if the registrant delayed initiation of additional rotational crop trials until determination of the residues to be regulated in plant commodities, provided additional data on primary plant metabolism are

submitted in a timely manner. We note that there are currently no rotational crop restrictions on disulfoton end-use product labels.

Table A2. Food/Feed Use Patterns Subject to Reregistration for Disulfoton (Case 0102).

Site Application Timing Application Type Application Equipment	Formulation [EPA Reg. No.]	Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Limitations [1,2]
Asparagus						
Foliar application postharvest (fern stage) Ground or aerial	8 lb/gal EC [AZ850007] [WA840036]	1.0 lb/A	3	Not specified (NS)	45	Use limited to AZ, CA, NC, OR, and WA. Applications may be made in a minimum of 20 gal/A (ground) or 5 gal/A (aerial).
	8 lb/gal EC [CA840192]	1.0 lb/A	3	NS	30	
	8 lb/gal EC [NC860005]	1.0 lb/A	3	NS	120	
	8 lb/gal EC [OR840032]	1.0 lb/A	3	NS	180	
Barley						
At-planting Drill or broadcast soil or Postemergence Broadcast soil Ground	15% G [3125-172]	1.0 lb/A	2	NS	60 (grain) 30 (forage)	Applications may be repeated at a 21-day interval. A 30-day pregrazing interval (PGI) has been established.
At-planting Drill or broadcast soil Ground	15% G [ID850016] [OR800034] [WA850036]	1.0 lb/A	1	NS	75 (forage)	Use limited to ID, OR, and WA. A 75-day PGI has been established. Straw from harvested fields may be baled and used for feed.
	15% G [MT800004]	1.0 lb/A	1	NS	60	Use limited to MT. A 60-day PGI has been established. Straw from harvested fields may be baled and used for feed.
At-planting Soil injection Ground	8 lb/gal EC [3125-307]	0.25 oz/1,000 ft of row up to 1.0 lb/A	1 (Implied)	2.0 lb/A	60 (grain) 30 (forage)	A maximum of 2 lb ai/A may be applied per crop season regardless of the method used. A 30-day PGI has been established.

(continued; footnotes follow)

Table A2 *(continued)*.

Site Application Timing Application Type Application Equipment	Formulation [EPA Reg. No.]	Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Limitations [1,2]
Barley (continued)						
Foliar application Ground or aerial	8 lb/gal EC [3125-307]	0.5-1.0 lb/A	NS	2.0 lb/A	30 (grain)	A maximum of 2 lb ai/A may be applied per crop season regardless of the method used. Applications may be made in a minimum of 1 gal total volume/acre. The grazing of treated fields is prohibited.
Preplant, preemergence, or postemergence Broadcast application followed by sprinkler irrigation Ground or aerial	15% G [ID850016]	1.0 lb/A	1	NS	60 (grain) 30 (forage)	Use limited to ID, OR, and WA. A 30-day PGI has been established. Straw from harvested fields may be baled and used for feed.
	15% G [OR800034] [WA850036]	1.0 lb/A	1	NS	30	
Beans, Dry						
At-planting Soil injection or Postemergence Sidedress soil Ground	8 lb/gal EC [3125-307]	0.9-1.9 oz/1,000 ft of row [for any row spacing] or 1.0-2.0 lb/A [for a 30-inch row spacing]	1	NS	60	The feeding of treated vines or hay to livestock animals is prohibited.
At-planting Banded soil or Postemergence Sidedress soil Ground	2% G [3125-83]	1.0-1.8 oz/1,000 ft of row [for any row spacing]	1	NS	60 (Post-emergence)	The feeding of treated vines or hay to livestock animals is prohibited.

(continued; footnotes follow)

Table A2 *(continued)*.

Site Application Timing Application Type Application Equipment	Formulation [EPA Reg. No.]	Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Limitations [1,2]
Beans, Dry (continued)						
At-planting Banded soil Ground	2% G [3125-126]	1.2 oz/1,000 ft of row	1 (Implied)	NS	NS	The feeding of treated vines or hay to livestock animals is prohibited.
At-planting Banded or sidedress soil Ground	15% G [3125-172]	0.9-1.8 oz/1,000 ft of row [for any row spacing] or 1.0-2.0 lb/A [for a 30-inch row spacing]	1	NS	60	The feeding of treated vines or hay to livestock animals is prohibited.
Beans, Succulent (including snap or green lima)						
At-planting Soil injection Ground	8 lb/gal EC [3125-307]	0.9-1.9 oz/1,000 ft of row [for any row spacing] or 1.0-2.0 lb/A [for a 30-inch row spacing]	1	NS	60	The feeding of treated vines or hay to livestock animals is prohibited.
At-planting Banded soil Ground	2% G [3125-83] [3125-126]	1.0-1.8 oz/1,000 ft of row [for any row spacing]	1	NS	NS	The feeding of treated vines or hay to livestock animals is prohibited.
	2% G [3125-126]	1.2 oz/1,000 ft of row	1 (Implied)	NS	NS	
	15% G [3125-172]	0.9-1.8 oz/1,000 ft of row [for any row spacing] or 1.0-2.0 lb/A [for a 30-inch row spacing]	1	NS	60	

(continued; footnotes follow)

Table A2 *(continued)*.

Site Application Timing Application Type Application Equipment	Formulation [EPA Reg. No.]	Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Limitations [1,2]
Bermuda Grass (seed crop)						
Broadcast application Ground or aerial	8 lb/gal EC [CA920025]	1.0 lb/A	NS	NS	7	Use limited to CA. Applications may be made in a minimum of 15 gal/A (ground) or 5 gal/A (aerial). The use as pasture or the use of treated crop for feed, food, forage, or bedding is prohibited.
Broccoli						
Preplant incorporated or postemergence Broadcast soil Ground	15% G [3125-172] 8 lb/gal EC [3125-307]	1.1 oz/1,000 ft of row [for any row spacing] or 1.0 lb/A [for a 36-inch row spacing]	1	NS	NS	Use limited to transplant seed beds.
At-planting Banded soil or soil injection or Postemergence Sidedress soil Ground	2% G [3125-83]	1.0 oz/1,000 ft of row [for any row spacing] or 1 tsp 2% G/plant in the transplant hole	1	NS	14 (Post-emergence)	
	15% G [3125-172] 8 lb/gal EC [3125-307]	1.1 oz/1,000 ft of row [for any row spacing] or 1.0 lb/A [for a 36-inch row spacing]	1	NS	14	

(continued; footnotes follow)

Table A2 *(continued)*.

Site Application Timing Application Type Application Equipment	Formulation [EPA Reg. No.]	Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Limitations [1,2]
Broccoli (continued)						
At-planting Banded soil	2% G [3125-126]	0.8 oz/1,000 ft of row or 1 tsp 2% G/plant in the transplant hole	1 (Implied)	NS	NS	
Brussels Sprouts						
Preplant incorporated or postemergence Broadcast soil Ground	15% G [3125-172] 8 lb/gal EC [3125-307]	1.1 oz/1,000 ft of row [for any row spacing] or 1.0 lb/A [for a 36-inch row spacing]	1	NS	NS	Use limited to transplant seed beds.
At-planting Banded soil or soil injection or Postemergence Sidedress soil Ground	2% G [3125-83]	1.0 oz/1,000 ft of row [for any row spacing] or 1 tsp 2% G/plant in the transplant hole	2	NS	30 (Post-emergence)	
	15% G [3125-172] 8 lb/gal EC [3125-307]	1.1 oz/1,000 ft of row [for any row spacing] or 1.0 lb/A [for a 36-inch row spacing]	2	NS	30	Applications may be repeated at a 21-day interval.

(continued; footnotes follow)

Table A2 *(continued)*.

Site Application Timing Application Type Application Equipment	Formulation [EPA Reg. No.]	Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Limitations [1,2]
Brussels Sprouts (continued)						
At-planting Banded soil	2% G [3125-126]	0.8 oz/1,000 ft of row or 1 tsp 2% G/plant in the transplant hole	1 (Implied)	NS	NS	
Cabbage (including tight-heading varieties of Chinese cabbage)						
Preplant incorporated or postemergence Broadcast soil Ground	15% G [3125-172] 8 lb/gal EC [3125-307]	1.1 oz/1,000 ft of row [for any row spacing] or 1.0 lb/A [for a 36-inch row spacing]	1	NS	NS	Use limited to transplant seed beds.
At-planting Banded soil or soil injection or Postemergence Sidedress soil Ground	2% G [3125-83]	1.0 oz/1,000 ft of row [for any row spacing] or 1 tsp 2% G/plant in the transplant hole	1	NS	42 (Post-emergence)	
At-planting Banded soil or soil injection or Postemergence Sidedress soil Ground	15% G [3125-172] 8 lb/gal EC [3125-307]	1.1-1.7 oz/1,000 ft of row [for any row spacing] or 1.0 lb/A [for a 36-inch row spacing]	1	NS	42	

(continued; footnotes follow)

Table A2 *(continued)*.

Site Application Timing Application Type Application Equipment	Formulation [EPA Reg. No.]	Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Limitations [1,2]
Cabbage (continued)						
At-planting Banded soil	2% G [3125-126]	0.8 oz/1,000 ft of row or 1 tsp 2% G/plant in the transplant hole	1 (Implied)	NS	NS	
Cauliflower						
Preplant incorporated or postemergence Broadcast soil Ground	15% G [3125-172] 8 lb/gal EC [3125-307]	1.1 oz/1,000 ft of row [for any row spacing] or 1.0 lb/A [for a 36-inch row spacing]	1	NS	NS	Use limited to transplant seed beds.
At-planting Banded soil or soil injection or Postemergence Sidedress soil Ground	2% G [3125-83]	1.0 oz/1,000 ft of row [for any row spacing] or 1 tsp 2% G/plant in the transplant hole	2	NS	40 (Post-emergence)	
At-planting Banded soil or soil injection or Postemergence Sidedress soil Ground	15% G [3125-172] 8 lb/gal EC [3125-307]	1.1 oz/1,000 ft of row [for any row spacing] or 1.0 lb/A [for a 36-inch row spacing]	2	NS	40	Applications may be repeated at a 21-day interval.

(continued; footnotes follow)

Table A2 *(continued)*.

Site Application Timing Application Type Application Equipment	Formulation [EPA Reg. No.]	Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Limitations [1,2]
Cauliflower (continued)						
At-planting Banded soil	2% G [3125-126]	0.8 oz/1,000 ft of row or 1 tsp 2% G/plant in the transplant hole	1 (Implied)	NS	NS	
Coffee Beans						
Preharvest and postharvest Soil (uniformly under the tree canopy) Ground	15% G [3125-172]	0.3-0.6 g/ft of tree height	2	NS	90	Use limited to PR. No more than one preharvest and one postharvest application may be made during the year.
Corn, Field						
At-planting Banded soil or Postemergence Sidedress soil Ground	8 lb/gal EC [3125-307]	1.2 oz/1,000 ft of row [for any row spacing] or 1.0 lb/A [for a 40-inch row spacing]	1 (soil)	NS	28	No more than two applications (one soil and one foliar application) may be made in one season. Foliar applications may be made in a minimum of 1 gal total volume/acre. A 28-day PGI has been established.
Foliar application Ground or aerial	8 lb/gal EC [3125-307]	0.5-1.0 lb/A	1 (foliar)	NS	28	

(continued; footnotes follow)

Table A2 *(continued)*.

Site Application Timing Application Type Application Equipment	Formulation [EPA Reg. No.]	Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Limitations [1,2]
Corn, Pop						
At-planting Banded soil or Postemergence Sidedress soil Ground	8 lb/gal EC [3125-307]	1.2 oz/1,000 ft of row [for any row spacing] or 1.0 lb/A [for a 40-inch row spacing]	1 (soil)	NS	28	No more than two applications (one soil and one foliar application) may be made in one season. Foliar applications may be made in a minimum of 1 gal total volume/acre. A 28-day PGI has been established.
Foliar application Ground or aerial	8 lb/gal EC [3125-307]	0.5-1.0 lb/A	1 (foliar)	NS	28	
Corn, Sweet						
At-planting Banded soil or Postemergence Sidedress soil Ground	8 lb/gal EC [CA960014]	1.2 oz/1,000 ft of row [for any row spacing] or 1.0 lb/A [for a 40-inch row spacing]	1 (soil)	NS	28	Use limited to CA. A 28-day PGI has been established. Foliar applications may be made in a minimum of 1 gal total volume/acre. No more than two applications (one soil and one foliar application) may be made in one season.
Foliar application Ground or aerial		0.5-1.0 lb/A	1 (foliar)	NS	28	

(continued; footnotes follow)

Table A2 *(continued)*.

Site Application Timing Application Type Application Equipment	Formulation [EPA Reg. No.]	Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Limitations [1,2]
Cotton						
Preplant incorporated Banded soil Ground	8 lb/gal EC [3125-307]	0.8-1.2 oz/1,000 ft of row [for any row spacing] or 0.6-1.0 lb/A [for a 40-inch row spacing]	3	NS	NS	A maximum of 3 soil applications of disulfoton may be made per crop season regardless of the method of application or the formulation used. The grazing of treated fields is prohibited.
At-planting/replanting Soil injection or in-furrow soil Ground	8 lb/gal EC [3125-307]	0.8-1.2 oz/1,000 ft of row [for any row spacing] or 0.6-1.0 lb/A [for a 40-inch row spacing]	3	NS	NS	
At-planting/replanting Banded soil Ground	15% G [3125-172]	0.8-1.2 oz/1,000 ft of row [for any row spacing] or 0.6-1.0 lb/A [for a 40-inch row spacing]	1	NS	NS	The feeding of treated forage to livestock is prohibited.
Post-plant (up to first squaring) Soil injection Ground	8 lb/gal EC [3125-307]	2.0 lb/A	1	NS	90	A maximum of 2 postplant applications may be made per crop season with a retreatment interval of 21 days. A maximum of 3 soil applications of disulfoton may be made per crop season regardless of the method of application or the formulation used. The grazing of treated fields is prohibited.
Post-plant Soil injection Ground		1.0 lb/A	1	NS	28	

(continued; footnotes follow)

Table A2 *(continued)*.

Site Application Timing Application Type Application Equipment	Formulation [EPA Reg. No.]	Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Limitations [1,2]
Cotton (continued)						
Post-plant Sidedress soil incorporated Ground	15% G [3125-172]	0.8-1.2 oz/1,000 ft of row [for any row spacing] or 0.6-1.0 lb/A [for a 40-inch row spacing]	1	NS	28	Use limited to irrigated cotton only. A post-plant application may be made 21 days following an at-planting application. The feeding of treated forage is prohibited.
Foliar (prior to bloom) Ground or aerial	8 lb/gal EC [3125-307]	0.19-0.56 lb/A	3	NS	NS	Applications may be made in a minimum of 1 gal total volume/acre. If foliar applications are made, then soil applications may not be made during the same crop year.
Foliar (before bolls open) Ground or aerial	8 lb/gal EC [TX860007]	0.1-0.2 lb/A	2	NS	30	Use limited to TX. Applications may be made in a minimum of 1 gal total volume/acre. The grazing or feeding of treated forage to livestock is prohibited.
Seed treatment	95% RTU [3125-173]	3.33-6.65 oz/100 lb of seed	1	NS	Not applicable (NA)	Use of treated seeds for food or animal feed, processing of treated seeds for oil, or mixing of treated seeds with food or animal feed is prohibited.
Lentils						
At-planting Drill/broadcast soil or soil injection or Postemergence Sidedress soil Ground	15% G [3125-172] 8 lb/gal EC [3125-307]	1.0-2.5 lb/A	1	NS	50	The feeding of treated vines or hay to livestock animals is prohibited.

(continued; footnotes follow)

Table A2 *(continued)*.

Site Application Timing Application Type Application Equipment	Formulation [EPA Reg. No.]	Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Limitations [1,2]
Lettuce						
At-planting or post-plant Banded soil or soil injection Ground	8 lb/gal EC [3125-307]	0.6-1.2 oz/1,000 ft of row [for any row spacing] or 1.0-2.0 lb/A [for a 20-inch row spacing]	1	NS	60	Application to transplanted lettuce is prohibited.
At-planting Banded soil or soil injection Ground	8 lb/gal EC [CA810044]	1.2 oz/1,000 ft of row [for any row spacing] or 2.0 lb/A [for a 20-inch row spacing]	1 (Implied)	NS	60	Use limited to CA. Application may be made in a minimum of 20 gal/A.
	2% G [3125-83]	0.8-1.2 oz/1,000 ft of row [for any row spacing]	1 (Implied)	NS	NS	
	2% G [3125-126]	1.2 oz/1,000 ft of row	1 (Implied)	NS	NS	
	15% G [3125-172]	0.6-1.2 oz/1,000 ft of row or 1.0-2.0 lb/A [for a 20-inch row spacing]	1 (Implied)	NS	NS	Application to transplanted lettuce is prohibited.

(continued; footnotes follow)

Table A2 *(continued)*.

Site Application Timing Application Type Application Equipment	Formulation [EPA Reg. No.]	Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Limitations [1,2]
Oats						
Broadcast application Ground or aerial	8 lb/gal EC [ME880001]	0.5 lb/A	1	NS	60 (grain)	Use limited to ME. Application may be made in a minimum of 20 gal/A (ground) or 1 gal/A (aerial). The grazing of treated fields or cutting for forage is prohibited prior to the grain harvest stage (normal maturity).
Peanuts						
At-planting Banded soil or Postemergence Sidedress soil Ground	15% G [3125-172]	1.1-2.2 oz/1,000 ft of row [for any row spacing] or 1.0-2.0 lb/A [for a 36-inch row spacing]	1 (Implied)	NS	NS	
At-planting In-furrow or At-pegging Banded or sidedress soil Ground	15% G [NC920011] [VA920006]	1.1-2.2 oz/1,000 ft of row [for any row spacing] or 1.0-2.0 lb/A [for a 36-inch row spacing]	2	NS	72	Use limited to NC and VA. A 72-day PGI has been established.
Peas						
At-planting Banded soil Ground	2% G [3125-83]	1.0 oz/1,000 ft of row [for any row spacing]	1 (Implied)	NS	NS	The feeding of treated vines or hay to livestock animals is prohibited.
	2% G [3125-126]	0.8 oz/1,000 ft of row	1 (Implied)	NS	NS	

(continued; footnotes follow)

Table A2 *(continued)*.

Site Application Timing Application Type Application Equipment	Formulation [EPA Reg. No.]	Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Limitations [1,2]
Peas (continued)						
At-planting Drill/broadcast soil or soil injection or Postemergence Sidedress soil Ground	15% G [3125-172] 8 lb/gal EC [3125-307]	1.0-2.5 lb/A	1	NS	50	The feeding of treated vines or hay to livestock animals is prohibited.
Pecan						
Preharvest Banded soil (incorporated) Ground	15% G [3125-172] 8 lb/gal EC [3125-307]	1.5-3.0 lb/A	1	NS	80	Use limited to South Central and Southwestern States. The grazing of grass underneath trees is prohibited. The tank mixing of the formulated product with phosalone is not recommended.
Foliar application Ground	8 lb/gal EC [3125-307]	0.75-1.5 lb/A	3	NS	30	The grazing of grass underneath trees is prohibited. The tank mixing of the formulated product with phosalone is not recommended.
Foliar application Aerial		0.75-1.0 lb/A	3	NS	30	Applications may be made in a minimum of 5 gallons total volume per acre. The grazing of grass underneath trees is prohibited. The tank mixing of the formulated product with phosalone is not recommended.

(continued; footnotes follow)

Table A2 *(continued)*.

Site Application Timing Application Type Application Equipment	Formulation [EPA Reg. No.]	Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Limitations [1,2]
Pepper						
At-planting/transplanting Banded soil Ground	15% G [3125-172]	1.0-2.0 oz/1,000 ft of row [for any row spacing] or 1.0-2.0 lb/A [for a 32-inch row spacing]	1	NS	90	
Postemergence Sidedress soil Ground	8 lb/gal EC [CA770036]	2.0 lb/A	1	NS	60	Use limited to CA.
Potato						
Preplant incorporated or postemergence Broadcast soil incorporated Ground	15% G [3125-172] 8 lb/gal EC [3125-307]	3.0-4.0 lb/A	2	NS	75	No more than two soil applications of the 8 lb/gal EC formulation may be made per crop season regardless of the method used. The tank mixing of the formulated product with phosalone is not recommended.
At-planting Banded/sidedress soil Ground	2% G [3125-83]	2.4-3.6 oz/1,000 ft of row [for any row spacing]	1 (Implied)	NS	75	The tank mixing of the formulated product with phosalone is not recommended.
At-planting Banded Ground	2% G [3125-126]	2.4 oz/1,000 ft of row	1 (Implied)	NS	NS	
At-planting Banded soil or soil injection or Postemergence Sidedress soil Ground	15% G [3125-172] 8 lb/gal EC [3125-307]	2.3-3.5 oz/1,000 ft of row [for any row spacing] or 2.0-3.1 lb/A [for a 38-inch row spacing]	2	NS	75	No more than two soil applications of the 8 lb/gal EC formulation may be made per crop season regardless of the method used. The tank mixing of the formulated product with phosalone is not recommended.
Potato (continued)						

(continued; footnotes follow)

Table A2 *(continued)*.

Site Application Timing Application Type Application Equipment	Formulation [EPA Reg. No.]	Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Limitations [1,2]
Foliar application Ground or aerial	8 lb/gal EC [3125-307]	0.375-1.0 lb/A	3	NS	30	Applications may be made in a minimum of 1 gallon total volume per acre. The tank mixing of the formulated product with phosalone is not recommended.
Foliar application Ground (sprinkler irrigation)	8 lb/gal EC [3125-307]	3.0 lb/A	1	NS	60	Use limited to ID, OR, UT, and WA. Application may be made following an at-planting application.
Soil and/or foliar application Ground (sprinkler irrigation)	15% G [ID830035] [OR830057]	3.0 lb/A	2 (Implied)	NS	110 (soil) 75 (foliar)	Use limited to ID and OR. Applications may be repeated at a 28-day interval. If two applications are made, a 110-day PHI has been established for soil treatments and a 75-day PHI has been established for foliar treatments.
Sorghum						
At-planting Banded/in-furrow soil Ground	15% G [3125-172]	0.9-1.2 oz/1,000 ft of row [for any row spacing] or 0.8-1.0 lb/A [for a 40-inch row spacing]	1 (Implied)	NS	NS	
Foliar broadcast Ground or aerial	15% G [3125-172]	1.2 oz/1,000 ft of row [for any row spacing] or 1.0 lb/A [for a 40-inch row spacing]	1 (Implied)	NS	30 (grain) 45 (forage and fodder)	Foliar broadcast application may be made directly into the whorl following at-planting application.

(continued; footnotes follow)

Table A2 *(continued)*.

Site Application Timing Application Type Application Equipment	Formulation [EPA Reg. No.]	Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Limitations [1,2]
Sorghum (continued)						
At-planting Banded/in-furrow soil Ground	8 lb/gal EC [3125-307]	0.9-1.2 oz/1,000 ft of row [for any row spacing] or 0.8-1.0 lb/A [for a 40-inch row spacing]	1 (Implied)	3.5 lb/A (2 soil plus 3 foliar applications)	NS	A maximum of 5 applications (2 soil applications plus 3 foliar applications) may be made to a single sorghum crop.
Post-plant (up to boot stage) Sidedress soil Ground	8 lb/gal EC [3125-307]	1.2 oz/1,000 ft of row [for any row spacing] or 1.0 lb/A [for a 40-inch row spacing]	NS	3.5 lb/A (2 soil plus 3 foliar applications)	45 (forage and fodder)	
Foliar broadcast Ground or aerial	8 lb/gal EC [3125-307]	0.25-0.5 lb/A	3	3.5 lb/A (2 soil plus 3 foliar applications)	See "use limitations"	Applications may be made in a minimum of 5 gal/A (ground) or 1 gal/A (aerial). A 34-day PHI (grain) and a 45-day PGI (forage and fodder) have been established for any soil plus any foliar application. A 7-day PHI (grain) and a 45-day PGI (forage and fodder) have been established for one or two foliar applications not preceded by soil applications. A 34-day PHI (grain) and a 60-day PGI (forage and fodder) have been established after three foliar applications not preceded by soil applications.

(continued; footnotes follow)

Table A2 *(continued)*.

Site Application Timing Application Type Application Equipment	Formulation [EPA Reg. No.]	Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Limitations [1,2]
Soybeans						
At-planting Banded soil Ground	15% G [3125-172]	1.2 oz/1,000 ft of row [for any row spacing] or 1.0 lb/A [for a 36-inch row spacing]	1 (Implied)	NS	75 (forage and hay)	
Postemergence Sidedress soil Ground	15% G [3125-172]	1.2 oz/1,000 ft of row [for any row spacing] or 1.0 lb/A [for a 36-inch row spacing]	1 (Implied)	NS	NS	Use limited to soybeans grown for seed. A label restriction prohibits the use of soybeans grown for seed for feed, food, or forage.
Tobacco						
Preplant incorporated Broadcast or banded soil Ground	15% G [3125-172]	3.0-6.0 oz/1,000 ft of row [for any row spacing] or 2.0-4.0 lb/A [for a 48-inch row spacing]	1	NS	NS	
Preplant/postemergence (incorporated) Broadcast soil Ground	15% G [3125-172]	0.15 oz/100 sq. ft of transplant bed	1	NS	NS	Use limited to tobacco transplant seed beds.
Tomato						
Preplant incorporated Broadcast soil Ground	8 lb/gal EC [3125-307]	3.0 lb/A	1	NS	NS	Use limited to transplant seed beds.
Tomato (continued)						

(continued; footnotes follow)

Table A2 *(continued)*.

Site Application Timing Application Type Application Equipment	Formulation [EPA Reg. No.]	Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Limitations [1,2]
At-planting Soil injection or Postemergence Sidedress soil Ground	8 lb/gal EC [3125-307]	1.2-3.5 oz/1,000 ft of row [for any row spacing] or 1.0-3.0 lb/A [for a 38-inch row spacing]	2 (Implied)	NS	30	When two applications are made, applications should be made at 2.0 lb/A (2.4 oz/1,000 ft of row) at a 21-day interval.
Triticale						
Foliar application (spring or fall) Ground or aerial	8 lb/gal EC [WY870004]	0.25-0.75 lb/A	4 (Implied)	NS	30 (grain)	Use limited to WY. Two applications may be made in the fall with a 30-day retreatment interval followed by two applications in the spring at green-up with a retreatment interval of 30 days. Applications may be made in a minimum of 1 gal total volume/acre. The grazing of treated fields or cutting for forage after application is prohibited.
Wheat						
At-planting (fall) Drill or broadcast soil Ground	15% G [3125-172]	0.25 oz/1,000 ft of row or 1.0 lb/A	1	NS	75 (forage)	A 75-day PGI has been established.
At-planting Drill or broadcast soil Ground	15% G [ID850016] [OR800034] [WA850036]	1.0 lb/A	1	NS	75 (forage)	Use limited to ID, OR, and WA. A 75-day PGI has been established. Straw from harvested fields may be baled and used for feed.
	15% G [MT800004]	1.0 lb/A	1	NS	60	Use limited to MT. A 60-day PGI has been established. Straw from harvested fields may be baled and used for feed.

(continued; footnotes follow)

Table A2 *(continued)*.

Site Application Timing Application Type Application Equipment	Formulation [EPA Reg. No.]	Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Limitations [1,2]
Wheat (continued)						
At-planting (fall) Soil injection Ground	8 lb/gal EC [3125-307]	0.25 oz/1,000 ft of row or 1.0 lb/A	NS	NS	NS	The grazing of treated fields or cutting for forage after application is prohibited.
Foliar application (spring or fall) Ground or aerial	8 lb/gal EC [3125-307]	0.25-0.75 lb/A	3 (Implied)	NS	30 (grain)	An application may be made in the fall followed by applications in the spring at green-up with a retreatment interval of 30 days. Applications may be made in a minimum of 1 gal total volume/acre. The grazing of treated fields or cutting for forage after application is prohibited.
	8 lb/gal EC [NM880001] [OK880002] [TX900004]	0.25-0.75 lb/A	2	NS	30 (grain)	Use limited to NM, OK, and TX. Application may only be made if no at-planting application was made. Two applications may be made with a retreatment interval of 14 days. Applications may be made in a minimum of 1 gal total volume/acre. The grazing of treated fields or cutting for forage after application is prohibited.
Postemergence Broadcast application Ground or aerial	15% G [CA760019]	1.0 lb/A	1	NS	30	Use limited to CA. The grazing of treated fields or cutting greenchop for forage is prohibited. Straw from harvested fields may be baled and used for feed.

(continued; footnotes follow)

Table A2 *(continued)*.

Site Application Timing Application Type Application Equipment	Formulation [EPA Reg. No.]	Single Application Rate, ai	Maximum Number of Applications Per Season	Maximum Seasonal Rate, ai	Preharvest Interval, Days	Use Limitations [1,2]
Wheat (continued)						
Preplant, preemergence, or postemergence Broadcast application followed by sprinkler irrigation Ground or aerial	15% G [ID850016] [OR800034] [WA850036]	1.0 lb/A	1	NS	30	Use limited to ID, OR, and WA. A 30-day PGI has been established. Straw from harvested fields may be baled and used for feed.

[1] The restricted entry interval (REI) for the 15% G (EPA Reg. No. 3125-172) and the 8 lb/gal EC (EPA Reg. No. 3125-307) formulations is 48 hours; except in outdoor areas where rainfall is less than 25 inches per year when each 48 hour REI is increased to 72 hours.

[2] When disulfoton is used at-planting, the registered formulation should not be applied directly onto the seed.

Table B. Residue Chemistry Science Assessments for Reregistration of Disulfoton.

GLN: Data Requirements	Current Tolerances, ppm [40 CFR]	Must Additional Data Be Submitted?	References [1]
860.1200: Directions for Use	N/A = Not Applicable	Yes [2]	See Tables A1 and A2.
860.1300: Plant Metabolism	N/A	Yes	00032409, 00034557, 00071767, 00089402, 00089403, 00090339, 00095498, 00095555, 43222401-43222404 [3], 44146501-44146502 [3]
860.1300: Livestock Metabolism	N/A	No	40939001-40939002 [4]
860.1340: Residue Analytical Methods			
- Plant commodities	N/A	Reserved [5]	00032409, 00041055, 00071233, 00071235, 00071237, 00071243, 00071245, 00089401, 00094212, 00095542, 00095618
- Livestock commodities	N/A	No [6]	
860.1360: Multiresidue Methods	N/A	No	
860.1380: Storage Stability Data	N/A	Yes [7]	00089899, 00090164, 00095579, 43447705 [8], 43957301 [8], 44248001 [9], 44248004 [10]
860.1500: Crop Field Trials			
<u>Root and Tuber Vegetables Group</u>			
- Beets, sugar	0.5 [180.183(a)]	No [11]	00095570, 00095611
- Potatoes	0.75 [180.183(a)]	No	00071238, 00095501, **40156610**

(continued; footnotes follow)

Table B *(continued)*.

GLN: Data Requirements	Current Tolerances, ppm [40 CFR]	Must Additional Data Be Submitted?	References [1]
Leaves of Root and Tuber Vegetables Group			
- Beets, sugar, tops	2.0 [180.183(a)]	No [11]	00095570, 00095611
Leafy Vegetables (except *Brassica* Vegetables) Group			
- Lettuce	0.75 [180.183(a)]	Yes [12]	00071234, 00089894, **40156601**, 44248003 [13]
- Spinach	0.75 [180.183(a)]	No [11]	00090337
Brassica (Cole) Leafy Vegetables Group			
- Broccoli	0.75 [180.183(a)]	No	00089855, 00090165, **40156605**
- Brussels sprouts	0.75 [180.183(a)]	No	00071234, 00095543, **40156604**
- Cabbage	0.75 [180.183(a)]	No	00090165, **40156602**
- Cauliflower	0.75 [180.183(a)]	No	00071234, 00095543, **40156603**
Legume Vegetables (Succulent or Dried) Group			
- Beans, succulent and dry	0.75 (dry, lima, and snap) [180.183(a)]	No	00071234, 00089893, 00089896, 00095585
- Peas, succulent and dry	0.75 [180.183(a)]	No	00071234, 00095543
- Soybeans, seed and aspirated grain fractions	0.1 (seed) [180.183(a)]	Yes [14]	00095549, **40156607**

(continued; footnotes follow)

Table B *(continued)*.

GLN: Data Requirements	Current Tolerances, ppm [40 CFR]	Must Additional Data Be Submitted?	References [1]
Foliage of Legume Vegetables Group			
- Beans, forage and hay	5.0 (vines) [180.183(a)]	Yes [15]	00071234, 00089893, 00089896, 00095585
- Peas, vines and hay	5.0 (vines) [180.183(a)]	Yes [16]	00071234, 00095543
- Soybeans, forage and hay	0.25 [180.183(a)]	No	00095549, **40156607**
Fruiting Vegetables (except Cucurbits) Group			
- Peppers	0.1 [180.183(a)]	No	00036249
- Tomatoes	0.75 [180.183(a)]	No [17]	00071234, 00089895, **40204309**
Tree Nuts Group			
- Pecans	0.75 [180.183(a)]	No	00057270
Cereal Grains Group			
- Barley, grain	0.75 [180.183(a)]	No [18]	00089892
- Corn, field, grain and aspirated grain fractions	0.3 (grain) [180.183(a)]	No	00091556, 00095554, 44248009 [19]
- Corn, pop	0.3 [180.183(a)]	No	
- Corn, sweet (K+CWHR)	0.3 [180.183(a)]	No	00041047, 00091556

(continued; footnotes follow)

Table B *(continued)*.

GLN: Data Requirements	Current Tolerances, ppm [40 CFR]	Must Additional Data Be Submitted?	References [1]
- Oats, grain	0.75 [180.183(a)]	No	00089892
- Rice, grain	0.75 [180.183(a)]	No [11]	00090333, 00095590
- Sorghum, grain and aspirated grain fractions	0.75 (grain) [180.183(a)]	No	00095502, 00095554, 00095556, 00095615, **40306401**, 44248007 [19]
- Wheat, grain and aspirated grain fractions	0.3 (grain) [180.183(a)]	No [20]	00090165, 00095551, **40156608**, **40156609**, 44248010 [19]
Forage, Fodder, and Straw of Cereal Grains Group			
- Barley, hay and straw	5.0 (green fodder and straw) [180.183(a)]	No [18,21]	00089892, **40204301**
- Corn, field, forage and stover	5.0 [180.183(a)]	No	00091556, 00095554
- Corn, pop, stover	5.0 (forage and fodder) [180.183(a)]	No	
- Corn, sweet, forage and stover	5.0 [180.183(a)]	No	00041047, 00091556
- Oats, forage, hay, and straw	5.0 (green fodder and straw) [180.183(a)]	No [22]	00089892
- Rice, straw	5.0 [180.183(a)]	No [11]	00090333, 00095590
- Sorghum, forage and stover	5.0 [180.183(a)]	No [23]	00095502, 00095554, 00095556, 00095615

(continued; footnotes follow)

Table B *(continued)*.

GLN: Data Requirements	Current Tolerances, ppm [40 CFR]	Must Additional Data Be Submitted?	References [1]
- Wheat, forage, hay, and straw	5.0 (green fodder and straw) [180.183(a)]	Yes [20,24]	00090165, 00095551, **40156608**
Nongrass Animal Feeds (Forage, Fodder, Straw, and Hay) Group			
- Alfalfa, forage and hay	5.0 (fresh); 12.0 (hay) [180.183(a)]	No [11]	00090165, 00095502, **40204305**
- Clover, forage and hay	5.0 (fresh); 12.0 (hay) [180.183(a)]	No [11]	00091497
Miscellaneous Commodities			
- Asparagus	0.1 [180.183(b)]	No [25]	00109459, 40005301 [26], **40056701**
- Coffee, beans	0.3 [180.183(a)]	No	00090133, 00095617, **40204302**
- Cotton, seed and gin byproducts	0.75 (seed) [180.183(a)]	Yes [27]	00090234, 00095622, **00162859** [28], **40204304**
- Hops	0.5 [180.183(a)]	No [11]	00032409
- Peanuts, nutmeat and hay	0.75 (nutmeat); 5.0 (hay); 0.3 (hulls) [180.183(a)]	No [29]	00090337, **40204311**
- Pineapple	0.75 (pineapple); 5.0 (foliage) [180.183(a)]	No [11]	00090335
- Sugarcane	0.3 [180.183(a)]	No [11]	00095548

(continued; footnotes follow)

Table B *(continued)*.

GLN: Data Requirements	Current Tolerances, ppm [40 CFR]	Must Additional Data Be Submitted?	References [1]
- Tobacco	N/A	No [30]	00002477, 00095498, **40204303**, 42850201 [31], 44146503 [32], 44301901 [33]
- Crops grown solely for seed	N/A	No [34]	
860.1520: Processed Food/Feed			
- Barley	None established	No [35]	
- Beet, sugar	5.0 (dried pulp) [186.1950]	No [11]	
- Coffee	None established	No	44248008 [13]
- Corn, field	None established	No	**40204307**, 44248009 [19]
- Cottonseed	None established	No	44248006 [13]
- Oats	None established	No [36]	
- Peanuts	None established	No	**40768901**
- Pineapples	5.0 (bran) [186.1950]	No [11]	
- Potatoes	None established	No	44248005 [10]
- Rice	None established	No [11]	
- Sorghum	None established	Yes [37]	
- Soybean	None established	No	00095549, **40306402**
- Sugarcane	None established	No [11]	00095548
- Tomatoes	None established	No	**40204310**
- Wheat	None established	No	**40561201**, 44248010 [19]

(continued; footnotes follow)

Table B *(continued)*.

GLN: Data Requirements	Current Tolerances, ppm [40 CFR]	Must Additional Data Be Submitted?	References [1]
860.1480: Meat, Milk, Poultry, Eggs			
- Milk and the Fat, Meat, and Meat Byproducts of Cattle, Goats, Hogs, Horses, and Sheep	None established	Reserved [38]	PP 7F1895
- Eggs and the Fat, Meat, and Meat Byproducts of Poultry	None established	Reserved [38]	PP 7F1895
860.1400: Water, Fish, and Irrigated Crops	None established	N/A	
860.1460: Food Handling	None established	N/A	
860.1850: Confined Rotational Crops	N/A	No	40120601 [39], 43447701-43447702 [8]
860.1900: Field Rotational Crops	None	Yes [40]	40120602 [39], 43447703-43447704 [8]

[1] **Bolded** references were reviewed in the Residue Chemistry Chapter of the Disulfoton Reregistration Standard Update dated 1/25/91. Unbolded references, unless otherwise indicated, were reviewed in the Residue Chemistry Chapter of the Disulfoton Reregistration Standard dated 4/6/84. All other references were reviewed as indicated in these endnotes.

[2] Label amendments are required for all disulfoton end-use products to specify that application using aerial equipment, when allowed, should be made in a minimum of 2 gal/A, or 10 gal/A for orchard crops.

Additional label amendments are required for specific crops; required amendments are detailed in the endnotes for the crops under 860.1500. The status of data requirements in this Table depends on incorporation of all required amendments. Amendments are also required for certain uses to qualify as nonfood, as discussed in the text section 860.1200.

[3] CBRS Nos. 13715, 17656, and 17657; DP Barcodes D203210, D231362, and D231369, 3/18/97, J. Abbotts.

[4] CB No. 4818, 3/30/89, H. Fonouni.

[5] Plant metabolism data remain outstanding. If the required plant metabolism data indicate additional disulfoton residues of concern, then additional analytical methodology will be required.

[6] Currently, there are no tolerances for livestock commodities.
D241353, 12/15/97, J. Abbotts: The Update to the Residue Chemistry Chapter (1/25/91) concluded that

Table B *(continued)*.

Method II in PAM, Vol. II was acceptable for data collection and enforcement purposes for livestock commodities, for identified tolerance residues (see Figure 1). Based on Agency laboratory validation, LOQ was 0.05 ppm for meat and 0.01 ppm for milk.

[7] Storage stability data for livestock commodities will be required to support the outstanding livestock feeding studies unless samples are stored less than one month prior to analysis.

[8] CBRS Nos. 14708 and 17253, DP Barcodes D209425 and D226575, 4/16/97, J. Abbotts.

[9] CBRS No. 17896, DP Barcode D235166, 6/18/97, J. Abbotts.

[10] CBRS No. 17898, DP Barcode D235170, 5/14/97, J. Abbotts.

[11] The basic registrant is not supporting use of disulfoton on the following crops: alfalfa, clover, hops, pineapple, rice, spinach, sugar beets, and sugarcane. All Bayer-registered uses on these crops have been canceled. Provided corresponding tolerances are revoked, no additional residue data will be required.

[12] The available field trial data support reregistration of the 8 lb/gal EC formulation for one soil application not to exceed 2 lb ai/A with a 60-day PHI. Field trial data to support the G formulation remain outstanding.

[13] CBRS No. 17899, DP Barcode D235171, 7/8/97, J. Abbotts.

[14] Data for soybean aspirated grain fractions are not required as disulfoton use on soybeans is early season, and processing data indicated that surface residues are not expected to be greater than residues in or on whole seed. For use on crops grown for seed, see discussion in this document under 860.1500; label amendments or additional field trial data are required.

[15] Field trial data for cowpea forage and hay must be submitted. If product labels are modified to exclude use on cowpeas, then field trial data are not required.

[16] Field trial data for field pea vines and hay must be submitted. If product labels are modified to exclude use on field peas, then field trial data are not required.

[17] Field residue data to support use in transplant seed beds are not available. Unless the registrant submits field residue data for tomatoes grown in treated transplant beds, this use must be removed from product labels.

[18] Product labels must be amended to reflect the use pattern for which adequate field trial data have been submitted: one soil application followed by one foliar application at 1 lb ai/A/application with a 30-day PHI. All restrictions against the grazing of treated fields must be removed from product labels and replaced with at least a 30-day PGI/PHI.

[19] CBRS No. 17897, DP Barcode D235168, 5/22/97, J. Abbotts.

[20] Product labels must be amended to reflect the use pattern for which adequate field trial data have been submitted: one soil application at 1 lb ai/A followed by two foliar applications at 0.75 lb ai/A/application with a 30-day PHI for foliar applications and a 75-day PHI for soil applications. All restrictions against the grazing of treated fields or cutting of treated fields for forage must be removed from product labels and replaced with at least a 30-day PGI/PHI for foliar applications and a 75-day PGI/PHI for soil applications.

Table B *(continued)*.

An SLN exists for foliar use of disulfoton on triticale (WY870004). Unless field trial data to support this use have been submitted since the Update, SLN No. WY870004 must be canceled.

[21] [Deleted in editing]

[22] The Agency currently recognizes oat hay as a RAC (Table 1, OPPTS 860.1000). The required data for wheat hay can be translated to oat hay.

[23] Product labels must be amended to reflect the use pattern for which adequate field trial data have been submitted: one at-plant application and one sidedress application at 1 lb ai/A/application, followed by three foliar applications at 0.5 lb ai/A/application, with a 45-day PHI for forage and fodder.

[24] The Agency currently recognizes wheat hay as a RAC (Table 1, OPPTS 860.1000). Once label conditions are consistent with field trial data submitted (see note 20), a tolerance for wheat hay will be established.

[25] EPA SLN No. CA840192 must be modified to reflect a 45-day PHI; alternatively, field trial data reflecting a 30-day PHI may be submitted.

[26] CB No. 1688, 12/10/86, M. Metzger.

[27] No field trial data are available to support the maximum use rate for foliar application of disulfoton to cotton. Therefore, labels must be amended such that foliar use rates are consistent with available data.

The Agency currently recognizes cotton gin byproducts (commonly called gin trash, which include the plant residues from ginning cotton consisting of burrs, leaves, stems, lint, immature seeds, and sand and/or dirt) as a RAC (Table 1, OPPTS 860.1000). Data depicting the magnitude of disulfoton residues of concern in/on cotton gin byproducts following application(s) of a representative formulation according to the maximum registered use patterns are required. Cotton must be harvested by commercial equipment (stripper and mechanical picker) to provide an adequate representation of plant residue for the ginning process. A minimum of three field trials for each type of harvesting (stripper and mechanical picker) are required, for a total of six field trials. An appropriate tolerance for this RAC should be proposed once acceptable data have been submitted and evaluated.

[28] Also reviewed in CB No. 1394, 9/24/86, F. Suhre.

[29] Two 24(c) registrations exist for use of disulfoton on peanuts in-furrow at-planting (SLN Nos. NC920011 and VA920006). CBRS 10141, 7/23/92, S.A. Knizner, concluded that available field trial data indicate that residues may exceed the tolerance for peanut hay when peanuts are treated according to that use. Either SLN Nos. NC920011 and VA920006 should be canceled, or the registrant may modify the labels for these SLNs to establish feeding restrictions for peanut hay.

[30] DP Barcode D238139, 9/23/97, J. Abbotts.

[31] CBRS No. 12817, DP Barcode D196216, 11/24/93, D. Miller.

[32] CBRS No. 17659, DP Barcode D231360, 3/7/97, J. Abbotts.

[33] DP Barcode D238139, 9/23/97, J. Abbotts.

Table B *(continued)*.

[34] The registrant has stated that uses on Bermuda grass, carrots, garlic, onions, radishes, and turnips grown for seed are not being supported for reregistration. Currently, uses on Bermuda grass and radish grown for seed exist. Use on Bermuda grass, under SLN No. CA920025, must be canceled (CBTS No. 10947, DP Barcode D185316, 12/18/92, W. Wassell) as there are no supporting residue data available. However, use on radish grown for seed, under SLN Nos. WA920026 and WA920027, can be considered a nonfood use (CBTS No. 15111, DP Barcode D212168, 2/14/95, B. Schneider). Therefore, no field residue data are required to support use on radish grown for seed and the registrant may retain this use.

[35] Data for wheat processed commodities were translated to barley.

[36] Data for wheat processed commodities were translated to oats.

[37] Residue data for sorghum syrup must be submitted. If product labels are modified to exclude use on sweet sorghum, then residue data are not required.

[38] D241353, 12/15/97, J. Abbotts: Available livestock feeding data are acceptable, up to feeding levels of 7 ppm for ruminants and 36 ppm for poultry. Tolerances were recommended for milk and ruminant meat; tolerances for poultry commodities are not required. Once the nature of the residue in plants is adequately understood and magnitude of the residue data are available on all major feed items, the need for this requirement will be reevaluated.

[39] EFGWB Review, DP Barcode D157584, 2/12/92, A. Abramovitch.

[40] Rotational tolerances requirements can be waived for cereal grains at any plantback interval and for leafy vegetables provided the plantback interval is at least 240 days. Extensive field rotational crop trials must be conducted for all other crops for which rotation is desired. The Agency would not object if the registrant delayed initiation of rotational trials until determination of the residues to be regulated in plant commodities, provided additional plant metabolism data were submitted in a timely manner.

TOLERANCE REASSESSMENT SUMMARY

Tolerances for residues of disulfoton in/on plant commodities [40 CFR §180.183(a) and (b)] are currently expressed in terms of the combined residues of disulfoton and its cholinesterase-inhibiting metabolites, calculated as demeton. Tolerances for residues of disulfoton in processed feed commodities [40 CFR §186.1950] are presently expressed in terms of the residues of disulfoton *per se*, calculated as demeton. Plant metabolism data remain outstanding. Therefore, all tolerance reassessment presented here is tentative. Until outstanding plant metabolism data are submitted, the Agency has determined that residues to be regulated in plant commodities are disulfoton, disulfoton oxygen analog, and their sulfoxides and sulfones. In addition, the preferred enforcement method (GC method) calculates residues in terms of disulfoton. Therefore, the tolerance expression should be revised to state that tolerances are for the combined residues of disulfoton, disulfoton oxygen analog, and their sulfoxides and sulfones, each designated by full chemical name (Table A), calculated as disulfoton.

The tolerances listed in 40 CFR need to be reorganized in order to conform with the requirements of the Food Quality Protection Act (FQPA). The FQPA amends the FFDCA to bring all EPA pesticide tolerance-setting activities under a single section of the statute, Section 408. The FQPA authorizes the conversion of all existing Section 409 tolerances for pesticide residues in processed food/feed into Section 408 tolerances.

The Agency has recently updated the list of raw agricultural and processed commodities and feedstuffs derived from crops (Table 1, OPPTS GLN 860.1000). As a result of changes to Table 1, disulfoton tolerances for certain commodities which have been removed from Table 1 need to be revoked, and some commodity definitions must be corrected. In addition, tolerances for commodities for which there are currently no registered uses of disulfoton need to be revoked. A summary of disulfoton tolerance reassessments is presented in Table C.

Tolerances Listed Under 40 CFR §180.183(a):

Pending label amendments for some crops, adequate data are available to reassess the established tolerances for the following commodities, **as defined**: barley, grain; barley, straw; beans, dry; beans, lima; beans, snap; broccoli; Brussels sprouts; cabbage; cauliflower; coffee beans; corn, field, fodder; corn, field, forage; corn, grain; corn, pop, grain; corn, pop, fodder; corn, sweet, fodder; corn, sweet, forage; corn, sweet, grain (K+CWHR); cottonseed; oats, fodder, green; oats, grain; oats, straw; peanuts; peanuts, hay; peas; pecans; peppers; potatoes; grain sorghum, fodder; grain sorghum, forage; grain sorghum, grain; soybeans; soybeans, forage; soybeans, hay; tomatoes; wheat, fodder, green; wheat, grain; and wheat, straw.

Insufficient field trial data are available to reassess the tolerances for the following commodities, **as defined**: beans, vines; lettuce; peas, vines. The available field trial data for lettuce indicate that an increased tolerance for leaf lettuce is required.

The available residue data indicate that the established tolerance levels for the following commodities can be decreased: barley, grain; coffee beans; corn, field, fodder; corn, pop, fodder; corn, sweet, fodder; peanuts; pecans; potatoes; and wheat, grain.

The established tolerances for the following commodities should be revoked as there are currently no Bayer-registered uses of disulfoton on these commodities: alfalfa, fresh; alfalfa, hay; beets, sugar, roots; beets, sugar, tops; clover, fresh; clover, hay; hops; pineapples; pineapples, foliage; rice; rice, straw; spinach; and sugarcane.

The established tolerances for green barley fodder, popcorn forage, and peanut hulls should be revoked since these item are no longer considered significant livestock feed items (Table 1, OPPTS GLN 860.1000).

The established tolerances for sweet corn and oat commodities should be moved to 180.183(b) as registered uses of disulfoton on sweet corn and oats are restricted to CA and ME, respectively.

Tolerances To Be Proposed Under 40 CFR §180.183(a):

Tolerances must be proposed for cowpea hay and field pea hay. The appropriate tolerance levels for these commodities will be determined when adequate field trial data have been submitted and evaluated. The registrant may elect to exclude use of disulfoton on cowpeas and field peas instead of proposing tolerances.

A tolerance must be proposed for aspirated grain fractions. Concentration factors were 10.3x, 2.66x, and 1.35x for field corn, sorghum, and wheat aspirated grain fractions, respectively. Reassessed tolerances were 0.3 ppm for field corn, 0.75 ppm for sorghum grain, and 0.2 ppm for wheat grain. Multiplying concentration factors by reassessed tolerances gives 3 ppm for corn, 2 ppm for sorghum, and 0.3 ppm for wheat. The tolerance for aspirated grain fractions will be the highest of these values, 3.0 ppm.

As a result of changes in Table 1 (GLN 860.1000), tolerances are now required for cotton gin byproducts and the hay of oats. The appropriate tolerance levels for these commodities will be determined when adequate field trial data have been submitted and evaluated. Once field trial data on wheat hay are consistent with maximum label rates, data for wheat hay will be translated to oat hay.

Tolerances Listed Under 40 CFR §180.183(b):

The tolerance currently listed under 40 CFR §180.183(b) is established with regional registration. Adequate data are available to reassess the established tolerance for asparagus.

Tolerances To Be Proposed Under 40 CFR §180.183(b):

The tolerances listed under 40 CFR §180.183(a) for sweet corn commodities (grain, forage, and fodder) and oat commodities (green fodder, grain, and straw) should be listed under 40 CFR 180.183(b) as use of disulfoton on these crops is restricted to CA and ME, respectively. A tolerance with regional registration must be proposed for oat hay.

Tolerances Listed Under 40 CFR §186.1950:

The tolerances listed under 40 CFR §186.1950 for sugar beet pulp and pineapple bran should be revoked as there are currently no Bayer-registered uses of disulfoton on sugar beets or pineapple.

Pending Tolerance Petitions:

PP#7F1895: The following tolerances for residues of disulfoton and its cholinesterase-inhibiting metabolites were proposed: green alfalfa (1 ppm); alfalfa hay (4 ppm); barley green fodder (1 ppm); barley straw (1 ppm); bean vines (2 ppm); bean vine hay (8 ppm); green clover (1 ppm); clover hay (4 ppm); corn forage (1 ppm); corn fodder (1 ppm); oat green fodder (1 ppm); oat straw (1 ppm); sorghum forage (1 ppm); sorghum fodder (1 ppm); wheat green fodder (1 ppm); wheat straw (1 ppm); milk (0.01 ppm); and the fat, meat, and meat byproducts of cattle, goats, hogs, horses, and sheep (0.05 ppm). No action has been taken on this petition since 1984.

Table C. Tolerance Reassessment Summary for Disulfoton.

Commodity	Current Tolerance, ppm	Tolerance Reassessment, ppm	Comment/ *[Correct Commodity Definition]*
Tolerances Listed Under 40 CFR §180.183(a)			
Alfalfa, fresh	5.0	Revoke	There are currently no Bayer-registered uses of disulfoton on alfalfa.
Alfalfa, hay	12.0	Revoke	
Barley, fodder, green	5.0	Revoke	No longer considered a significant livestock feed item (Table 1, OPPTS 860.1000).
Barley, grain	0.75	0.20	
Barley, straw	5.0	5.0	
Barley, hay	5.0	5.0	
Beans, dry	0.75	0.75	*[Bean, seed]*
Beans, lima	0.75		
Beans, snap	0.75	0.75	*[Bean, succulent]*
Beans, vines	5.0	TBD [1,2]	*[Cowpea, forage]*
Beets, sugar, roots	0.5	Revoke	There are currently no Bayer-registered uses of disulfoton on sugar beets.
Beets, sugar, tops	2.0	Revoke	
Broccoli	0.75	0.75	
Brussels sprouts	0.75	0.75	
Cabbage	0.75	0.75	
Cauliflower	0.75	0.75	
Clover, fresh	5.0	Revoke	There are currently no Bayer-registered uses of disulfoton on clover.
Clover, hay	12.0	Revoke	
Coffee beans	0.3	0.2	*[Coffee, bean, green]*
Corn, field, fodder	5.0	3.0	*[Corn, field, stover]*
Corn, field, forage	5.0	5.0	
Corn, grain	0.3	0.30	*[Corn, field, grain]*
Corn, pop	0.3	0.30	*[Corn, pop, grain]*
Corn, pop, fodder	5.0	3.0	*[Corn, pop, stover]*
Corn, pop, forage	5.0	Revoke	No longer considered a significant livestock feed item (Table 1, OPPTS 860.1000).
Corn, sweet, fodder	5.0	3.0	Tolerances must be moved to 180.183(b) as use is restricted to CA. *[Corn, sweet, stover]*
Corn, sweet, forage	5.0	5.0	
Corn, sweet, grain (K+CWHR)	0.3	0.30	*[Corn, sweet (K+CWHR)]*
Cottonseed	0.75	0.75	*[Cotton, undelinted seed]*

(continued; footnotes follow)

Table C *(continued).*

Commodity	Current Tolerance, ppm	Tolerance Reassessment, ppm	Comment/ *[Correct Commodity Definition]*
Hops	0.5	Revoke	There are currently no Bayer-registered uses of disulfoton on hops.
Lettuce	0.75	0.75, head ≥ 2.0, leaf [3]	*[Lettuce, head]* *[Lettuce, leaf]*
Oats, fodder, green	5.0	5.0	*[Oats, forage]* Tolerances must be moved to 180.183(b) as use is restricted to ME.
Oats, grain	0.75	0.75	
Oats, straw	5.0	5.0	
Peanuts	0.75	0.10	*[Peanut, nutmeat]*
Peanuts, hay	5.0	5.0	*[Peanut, hay]*
Peanuts, hulls	0.3	Revoke	No longer considered a significant livestock feed item (Table 1, OPPTS 860.1000).
Peas	0.75	0.75	*[Pea, seed]* *[Pea, succulent]*
Peas, vines	5.0	TBD [2]	*[Pea, field, vines]*
Pecans	0.75	0.10	*[Pecan]*
Peppers	0.1	0.10	*[Pepper, bell]* *[Pepper, non-bell]*
Pineapples	0.75	Revoke	There are currently no Bayer-registered uses of disulfoton on pineapple.
Pineapples, foliage	5.0	Revoke	
Potatoes	0.75	0.50	*[Potato]*
Rice	0.75	Revoke	There are currently no Bayer-registered uses of disulfoton on rice.
Rice, straw	5.0	Revoke	
Sorghum, fodder	5.0	5.0	*[Sorghum, grain, stover]*
Sorghum, forage	5.0	5.0	*[Sorghum, grain, forage]*
Sorghum, grain	0.75	0.75	*[Sorghum, grain, grain]*
Soybeans	0.1	0.10	*[Soybean, seed]*
Soybeans, forage	0.25	0.25	*[Soybean, forage]*
Soybeans, hay	0.25	0.25	*[Soybean, hay]*
Spinach	0.75	Revoke	There are currently no Bayer-registered uses of disulfoton on spinach.
Sugarcane	0.3	Revoke	There are currently no Bayer-registered uses of disulfoton on sugarcane.
Tomatoes	0.75	0.75	*[Tomato]*
Wheat, fodder, green	5.0	5.0	*[Wheat, forage]*
Wheat, grain	0.3	0.20	

(continued; footnotes follow)

Table C *(continued).*

Commodity	Current Tolerance, ppm	Tolerance Reassessment, ppm	Comment/ *[Correct Commodity Definition]*
Wheat, straw	5.0	5.0	
Tolerances Listed Under 40 CFR §180.183(b)			
Asparagus	0.1	0.10	
Tolerances Listed Under 40 CFR §186.1950			
Sugar beet pulp	5	Revoke	There are currently no Bayer-registered uses of disulfoton on sugar beets.
Pineapple bran	5	Revoke	There are currently no Bayer-registered uses of disulfoton on pineapple.
Tolerances to be Proposed Under 40 CFR §180.183(a)			
Aspirated grain fractions	--	3.0	
Cotton, gin byproducts	--	TBD	
Cowpea, hay	--	TBD [2]	
Pea, field, hay	--	TBD [2]	
Meat of cattle, hogs, horses, goats, and sheep	--	0.05	
Meat byproducts of cattle, hogs, horses, goats, and sheep	--	0.05	
Fat of cattle, hogs, horses, goats, and sheep	--	0.05	
Milk	--	0.01	
Tolerances to be Proposed Under 40 CFR §180.183(b)			
Oats, hay	--	TBD [4]	

[1] TBD = to be determined. Field residue data remain outstanding.

[2] The registrant may elect to exclude use of disulfoton on cowpeas and field peas. If use of disulfoton on cowpeas and field peas is not allowed, tolerances for cowpea forage and hay and field pea vines and hay are not required.

[3] Field residue data remain outstanding; however, the available data indicate that a separate, higher tolerance for leaf lettuce is required.

[4] Required field residue data for wheat hay will be used to determine appropriate tolerance levels for oat hay.

(continued; footnotes follow)

CODEX HARMONIZATION

The Codex Alimentarius Commission has established several maximum residue limits (MRLs) for residues of disulfoton in/on various raw agricultural commodities. The Codex MRLs are expressed in terms of the sum of disulfoton, demeton-S, and their sulphoxides and sulphones expressed as disulfoton. Codex MRLs and the U.S. tolerances will be compatible when the U.S. tolerance expression is revised to include disulfoton, its oxygen analog, and their sulfoxides and sulfones, calculated as disulfoton. A comparison of the Codex MRLs and the corresponding **reassessed** U.S. tolerances is presented in Table D.

The following conclusions can be made regarding efforts to harmonize U.S. tolerances with Codex MRLs: (i) compatibility between the U.S. tolerances and Codex MRLs exists for barley; coffee beans; maize fodder; peanut; pecan; potato; and sorghum forage (green); and (ii) incompatibility of the U.S. tolerances and Codex MRLs remains for asparagus, barley straw and dry fodder, beans (dry), broccoli, head cabbages, cauliflower, common bean (pods and/or immature seeds), cotton seed, garden pea (young pods), shelled garden pea, head and leaf lettuce, maize, maize forage, oat forage, oat straw and dry fodder, oats, sorghum, sweet corn (corn-on-the-cob), wheat forage (whole plant), and wheat straw and dry fodder because of differences in good agricultural practices. No questions of compatibility exist with respect to commodities where Codex MRLs have been established but U.S. tolerances do not exist or will be revoked.

(continued; footnotes follow)

Table D. Codex MRLs and applicable U.S. tolerances for disulfoton. Recommendations are based on conclusions following reassessment of U.S. tolerances (see Table C).

Codex			Reassessed U.S. Tolerance, ppm	Recommendation And Comments
Commodity, As Defined	MRL (mg/kg)	Step		
Alfalfa fodder	5	CXL	None	The U.S. tolerance will be revoked.
Asparagus	0.02 (*) [1]	7B	0.10	
Barley	0.2	7C(a)	0.20	Compatibility exists.
Barley straw and fodder, Dry	3	CXL	5.0	
Beans (dry)	0.05	7C	0.75	
Broccoli	0.1	7C	0.75	
Cabbages, Head	0.2	7C	0.75	
Cauliflower	0.05	7C	0.75	
Cereal grains (except rice and maize)	0.2	CXL	--	(See barley, oats, and wheat)
Chicken eggs	0.02 (*)	7B	--	No U.S. tolerance exists.
Clover hay or fodder	10	CXL	None	The U.S. tolerance will be revoked.
Coffee beans	0.2	CXL	0.20	Compatibility exists.
Common bean (pods and/or immature seeds)	0.2	7C	0.75	
Cotton seed	0.1	7C	0.75	
Forage crops (green) (except maize forage)	5	CXL	--	(See oat and wheat forage)
Garden pea (young pods)	0.1	7C	0.75	
Garden pea, Shelled	0.02 (*)	7B	0.75	
Lettuce, Head	1	7C	0.75	
Lettuce, Leaf	1	7C	$\geq$ 2.0	
Maize	0.5	CXL	0.30	
Maize	0.01 [2]	7B(a)	0.30	
Maize fodder	3	CXL	3.0	Compatibility exists.
Maize forage	1	CXL	5.0	
Milk of cattle, goats, and sheep	0.01	7B	0.01	Compatibility exists.
Oat forage (green)	0.5	7C(a)	5.0	
Oat straw and fodder, Dry	0.05	7C	5.0	
Oats	0.02 (*)	7B(a)	0.75	
Peanut	0.1	CXL	0.10	Compatibility exists.

(continued; footnotes follow)

Table D *(continued).*

Codex			Reassessed U.S. Tolerance, ppm	Recommendation And Comments
Commodity, As Defined	MRL (mg/kg)	Step		
Pecan	0.1	CXL	0.10	Compatibility exists.
Pineapple	0.1	CXL	None	The U.S. tolerance will be revoked.
Potato	0.5	CXL	0.50	Compatibility exists.
Poultry meat	0.02 (*)	7B	--	No U.S. tolerance exists.
Radish, Japanese	0.2	CXL	--	No U.S. tolerance exists.
Rice	0.5	CXL	None	The U.S. tolerance will be revoked.
Sorghum	1	7C(a)	0.75	
Sorghum forage (green)	5	7C(a)	5.0	Compatibility exists.
Sugar beet	0.2	CXL	None	The U.S. tolerance will be revoked.
Sugar beet leaves or tops	2	CXL	None	The U.S. tolerance will be revoked.
Sweet corn (corn-on-the-cob)	0.02 (*)	7B	0.30	
Sweet corn (kernels)	0.02 (*)	7B	--	No U.S. tolerance exists (for kernels).
Vegetables (except as otherwise listed)	0.5	CXL	0.10 (peppers) 0.75 (tomatoes)	
Wheat	0.2	7C(a)	0.20	Compatibility exists.
Wheat forage (whole plant)	1	7C(a)	5.0	
Wheat straw and fodder, Dry	5	7C	5.0	Compatibility exists (for straw)

[1] (*) = At or about the limit of detection.
[2] The 1994 JMPR concluded that this MRL should not be designated as at the limit of determination.

DIETARY EXPOSURE ASSESSMENT

Anticipated residues have been determined for chronic dietary risk (CBRS 10904, 17923, 9/17/97, J. Abbotts).

AGENCY MEMORANDA RELEVANT TO REREGISTRATION

CB Nos.:	366 and 367
Subject:	Disulfoton (Di-Syston) Reregistration - Evaluation of Applications for Revised Labels for Di-Syston 8 (EPA Registration No. 3125-307) and Di-Syston 15% Granular (EPA Registration No. 3125-173) Re: Waiver of Residue Chemistry Data
From:	M. Firestone
To:	G. LaRocca and A. Rispin
Dated:	3/13/86
MRID(s):	None

CB No.:	1394
Subject:	TX860007: Section 24(c) registration for DI-SYSTON 8 on cotton.
From:	F. Suhre
To:	G. LaRocca/J. Shell
Dated:	9/24/86
MRID(s):	00162859

CB No.:	1499
Subject:	NC860005. Disulfoton (Di-Syston): 24(c) Registration on Asparagus in North Carolina
From:	W. Anthony
To:	G. LaRocca
Dated:	12/2/86
MRID(s):	None

CB No.:	1688
Subject:	NC860005. Disulfoton (DI-SYSTON 8EC, EPA Reg. No. 3125-307) on Asparagus. 24(c) Special Local Needs Registration.
From:	M. Metzger
To:	G. LaRocca
Dated:	12/10/86
MRID(s):	40005301

CB No.: 1961
Subject: NC860005. Disulfoton (DI-SYSTON 8EC, EPA Reg. No. 3125-307) on Asparagus. 24(C) Special Local Needs Registration.
From: M. Metzger
To: G. LaRocca/J. Shell
Dated: 4/15/87
MRID(s): None

CB No.: 2510
Subject: ID# WY-870004 Disulfoton [DI-SYSTON-8]: 24(c) on Triticale in Wyoming
From: W. Anthony
To: G. LaRocca
Dated: 7/31/87
MRID(s): None

CB No.: 3881
Subject: ME-880001, 24(c) Registration for Di-syston in or on Oats.
From: W. Chin
To: G. LaRocca
Dated: 6/23/88
MRID(s): None

CB No.: 4226
Subject: Disulfoton Registration Standard Follow Up. DEB Comments on Mobay Letter Dated July 20, 1988.
From: S. Willett
To: G. LaRocca and R. Engler
Dated: 10/6/88
MRID(s): None

CB No.: 4818
Subject: Response to the Guidance Document for Disulfoton, and Agency's Letter of July 30, 1987 to Mobay Corporation; Nature of the Residues in Livestock Commodities.
From: H. Fonouni
To: G. LaRocca
Dated: 3/30/89
MRID(s): 40939001 and 40939002

CB No.:	None
Subject:	Metabolism Peer Review Committee Meeting on Disulfoton
From:	R. Schmitt
To:	G. LaRocca
Dated:	8/17/89
MRID(s):	None

CB No.:	8435
DP Barcode:	D167836
Subject:	TX860007. 24(c) Amended Registration for Di-Syston 8 (EPA Reg. No. 3125-307) for use in or on cotton.
From:	D. McNeilly
To:	T. Lemaster
Dated:	9/6/91
MRID(s):	None

CB Nos.:	8354, 8355, and 8356
DP Barcodes:	D167312, D167316, and D167317
Subject:	DI-SYSTON (Disulfoton). Impact of Craven Analytical Data on Registrations.
From:	M. Flood
To:	G. LaRocca
Dated:	9/18/91
MRID(s):	None

DP Barcode:	D157584
Subject:	EFGWB Review of Confined Rotational Crop and Limited Rotational Crop Studies.
From:	A. Abramovitch
To:	L. Rossi, R. Bright, K. Samek
Date:	2/12/92
MRID(s):	40120601 and 40120602

CBTS No.:	10141
Subject:	VA920006. Di-Syston 15% Granular for in-furrow use at planting on peanuts.
From:	S. Knizner
To:	T. Lemaster
Dated:	7/23/92
MRID(s):	None

CBTS No.:	10947
DP Barcode:	D185316
Subject:	CA920025; Section 24(c), Disulfoton, (Di-Syston 8, EPA Reg. No. 3125-307) in or on bermuda grass grown for seed.
From:	W. Wassell
To:	G. LaRocca/T. Lemaster
Dated:	12/18/92
MRID(s):	None

CB No.:	None
DP Barcode:	None
Subject:	Disulfoton in/on Immature Cotton Grown from Treated Seed. Evaluation of Plant Metabolism and Estimation of Residue Levels.
From:	D. Davis
To:	D. Edwards
Dated:	9/2/93
MRID(s):	None

CBRS No.:	11339
DP Barcode:	D187260
Subject:	Disulfoton. CBRS Comments on Proposed Protocol for Pyrolysis Study.
From:	D. Miller
To:	PM Team 72
Dated:	9/10/93
MRID(s):	None

CBRS No.: 12817
DP Barcode: D196216
Subject: Disulfoton. Nature of the Residue Study on Tobacco.
From: D. Miller
To: S. Jennings
Dated: 11/24/93
MRID(s): 42850201

CBRS No.: None
DP Barcode: None
Subject: Disulfoton. Response to 48 Hour Review Request.
From: D. Miller
To: S. Jennings
Dated: 6/23/94
MRID(s): None

CBTS No.: 15111
DP Barcode: D212168
Subject: Evaluation of Washington State Department of Agriculture Request for Nonfood/Nonfeed Status for Small-Seeded Vegetable Seed Crops.
From: B. Schneider
To: S. Johnson
Dated: 2/14/95
MRID(s): None

CBRS No.: 17659
DP Barcode: D231360
Subject: Disulfoton (032501), Reregistration Case 102. Registrant Bayer Corporation. Guideline 860.1000. Tobacco Pyrolysis.
From: J. Abbotts
To: P. Deschamp
Dated: 3/7/97
MRID(s): 44146503

CBRS Nos.: 13715, 17656, and 17657
DP Barcodes: D203210, D231362, and D231369
Subject: Disulfoton (032501), Reregistration Case 102. Registrant Bayer Corporation. Guideline 860.1300, Nature of the Residue, Plants.
From: J. Abbotts

To: P. Deschamp
Dated: 3/18/97
MRID(s): 43222401-43222404, 44146501, and 44146502

CBRS No.: 17869
DP Barcode: D235210
Subject: Disulfoton (032501), Reregistration Case No. 0102. Issues to be presented at the 4/21/97 meeting of the HED Metabolism Committee.
From: J. Abbotts
To: HED Metabolism Committee
Dated: 4/15/97
MRID(s): None

CBRS Nos.: 14708 and 17253
DP Barcodes: D209425 and D226575
Subject: Disulfoton (032501), Reregistration Case 102. Registrant Bayer Corporation. Guideline 860.1850, Confined Rotational Crops. Guideline 860.1900, Field Rotational Crops. Guideline 860.1380, Storage Stability.
From: J. Abbotts
To: J. Smith
Dated: 4/16/97
MRID(s): 43447701-43447705 and 43957301

CBRS No.: 17887
DP Barcode: D235406
Subject: Results of the HED Metabolism Committee Meeting Held on 4/21/97: Disulfoton in Plants.
From: J. Abbotts
To: HED Metabolism Committee
Dated: 5/1/97
MRID(s): None

CBRS No.: 17898
DP Barcode: D235170
Subject: Disulfoton (032501), Reregistration Case 102. Registrant Bayer Corporation. Guideline 860.1520. Potato Processing. Guideline 860.1380. Storage Stability, Potato Commodities.
From: J. Abbotts
To: P. Deschamp

Dated: 5/14/97
MRID(s): 44248004 and 44248005

CBRS No.: 17897
DP Barcode: D235168
Subject: Disulfoton (032501), Reregistration Case 102. Registrant Bayer Corporation. Guideline 860.1500. Field Trial Data, Cereal Grains. Guideline 860.1520. Processing Studies, Cereal Grains.
From: J. Abbotts
To: P. Deschamp
Dated: 5/22/97
MRID(s): 44248007, 44248009, and 44248010

CBRS No.: 17896
DP Barcode: D235166
Subject: Disulfoton (032501), Reregistration Case 102. Registrant Bayer Corporation, Response to DCI. Residue Chemistry Guidelines (Series 860).
From: J. Abbotts
To: P. Wagner
Dated: 6/18/97
MRID(s): 44248001

CBRS No.: 17899
DP Barcode: D235171
Subject: Disulfoton (032501), Reregistration Case 102. Registrant Bayer Corporation. Guideline 860.1500. Field Trial Data, Lettuce. Guideline 860.1520. Processing, Coffee and Cotton.
From: J. Abbotts
To: P. Wagner
Dated: 7/8/97
MRID(s): 44248003, 44248006, and 44248008

DP Barcode: D238139
Subject: Disulfoton (032501), Reregistration Case 102. Registrant Bayer Corporation. Guideline 860.1000. Tobacco Pyrolysis.
From: J. Abbotts
To: D. Anderson and D. Lateulere
Dated: 9/23/97

MRID(s): 44301901

MASTER RECORD IDENTIFICATION NUMBERS

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